VOL. 36, NO. 5 MAY, 1959

AMERICAN JOURNAL OF OPTOMETRY *and* ARCHIVES *of* AMERICAN ACADEMY OF OPTOMETRY

EDITOR
CAREL C. KOCH

EDITORIAL COUNCIL
JOHN D. PERRY, JR. Chairman
ROBERT E. BANNON
RUDOLPH EHRENBERG
V. J. ELLERBROCK
BENTON FREEMAN
GLENN A. FRY
ROBERT GRAHAM
MONROE J. HIRSCH
HENRY W. HOFSTETTER
MEREDITH W. MORGAN
HENRY B. PETERS
MAX SCHAPERO
ARTHUR SHLAIFER
KENNETH B. STODDARD
RALPH E. WICK
JOHN ZETTEL

CONTENTS

ORIGINAL PAPERS

Brightness Contrast, Illumination Intensity and Visual Efficiency.
Miles A. Tinker 221

The Use of High-Add Bifocals in Cases of Low Visual Acuity.
John Zettel, Jr. 237

Refracting Patients With an Over Active Ciliary—A Case Report.
Marshall V. Mark 245

EDITORIAL

Is the Fitting of Contact Lenses an Optometric Specialty?
Monroe J. Hirsch 248

SPECIAL REPORTS

Optometry and Interprofessional Relations.
Carel C. Koch 251

A Review of Optometry in Colombia.
Hernando Henao, R., Jr. 266

CURRENT COMMENTS

First World Contact Lens Congress.
Terry Judith Parkins 269-278

Published Monthly by the AMERICAN JOURNAL OF OPTOMETRY PUBLISHING ASSOCIATION,
1508 Foshay Tower, 821 Marquette Ave., Minneapolis 2, Minn.

ANNUAL SUBSCRIPTION, UNITED STATES and CANADA $8.00; FOREIGN $9.00.
Single Copies, 80c

Entered as second-class matter, February 20, 1924, at the post office at Minneapolis 2, Minnesota, under the Act of March 3, 1879.
Established 1924.

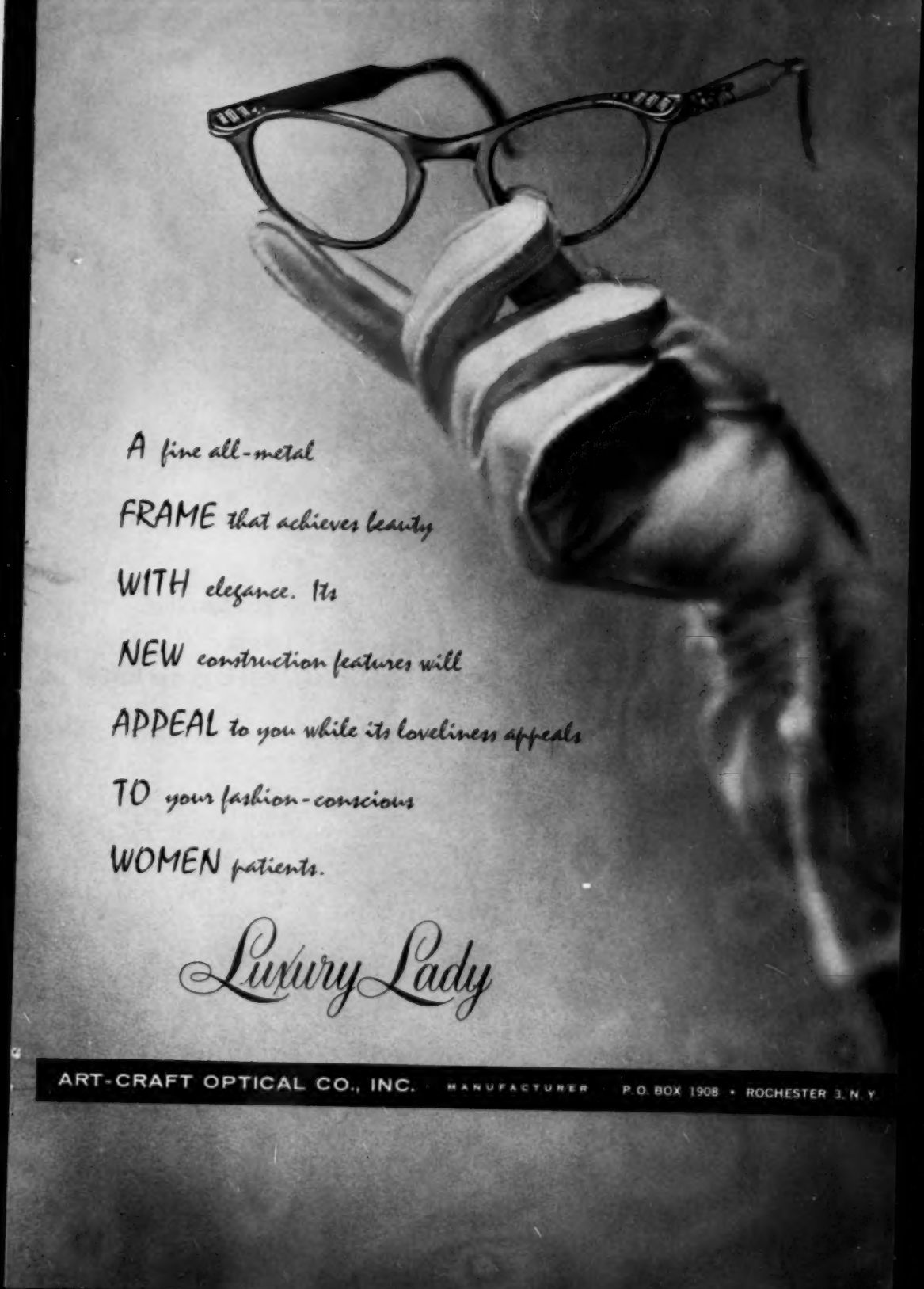
2 NEW COLORS = GUN METAL COPPERTONE

. . . in Continental's Popular Lurium Mansfram!

Added to the Lurium BROWN and GRAY, this rugged, yet lightweight combination frame is now available in 4 color choices to suit most men's preference.

Clear crystal detachable pads; matching Lurium skull temples with comfortable crystal tips; 18 to 26 bridges; 44-46-48 eye sizes; Catalog No. 70-65.

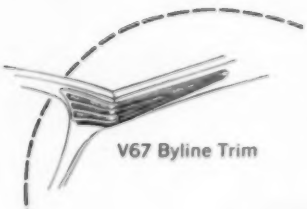
Continental INDIANAPOLIS


A fine all-metal
FRAME that achieves beauty
WITH elegance. Its
NEW construction features will
APPEAL to you while its loveliness appeals
TO your fashion-conscious
WOMEN patients.
Luxury Lady
ART-CRAFT OPTICAL CO., INC. MANUFACTURER P.O. BOX 1908 • ROCHESTER 3, N.Y.

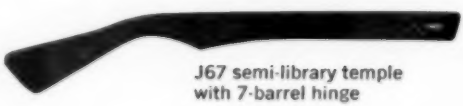
The RIGHT EYEWEAR at the RIGHT TIME makes a world of difference!

BYLINE popularity prompts new colors: Smoke Lite, Bronze Lite

BYLINE is a hit! It's the answer for the man who wants smart styling combined with all 'round wearing comfort. Show it now in two new muted transparents: Smoke Lite for the man who wears gray; Bronze Lite for those who are smartest in browns. New Byline trim, V67, adds just the right touch of elegance. Gold filled (1/10 12K) in Arista and White.



V67 Byline Trim



J67 semi-library temple
with 7-barrel hinge

Frames by BAUSCH & LOMB

RIGHT IN FASHION . . . RIGHT IN FUNCTION

Surely, one woman
LIBBY TINSEL
L-200CB by LIBERTY
LIBERTÉ
L-17 by LIBERTY

will tell another!

MATINEE
L-400 by LIBERTY

LIBBY STARLITE
L-500A by LIBERTY

From Shuron's COMPLETE line of men's

THE SAME TOP AND

The illustration tells the story at *two* glances—
a look at the smart new top treatment shows the
top, temple, and corner similarity . . . a look at
the "eyes" and bridge shows the difference
in the styles.

Rondon — Combination

New, *all*-new version of the Browline®
incorporating a revolutionary new latch-lock
toprim assembly. In Black Briar, Golden Briar,
Briar Grey and Cordova: 44 to 48—18 to 24;
50—20 to 24. Matching Oxford Temple
(5-barrel hinge) from 5¼" to 6½".

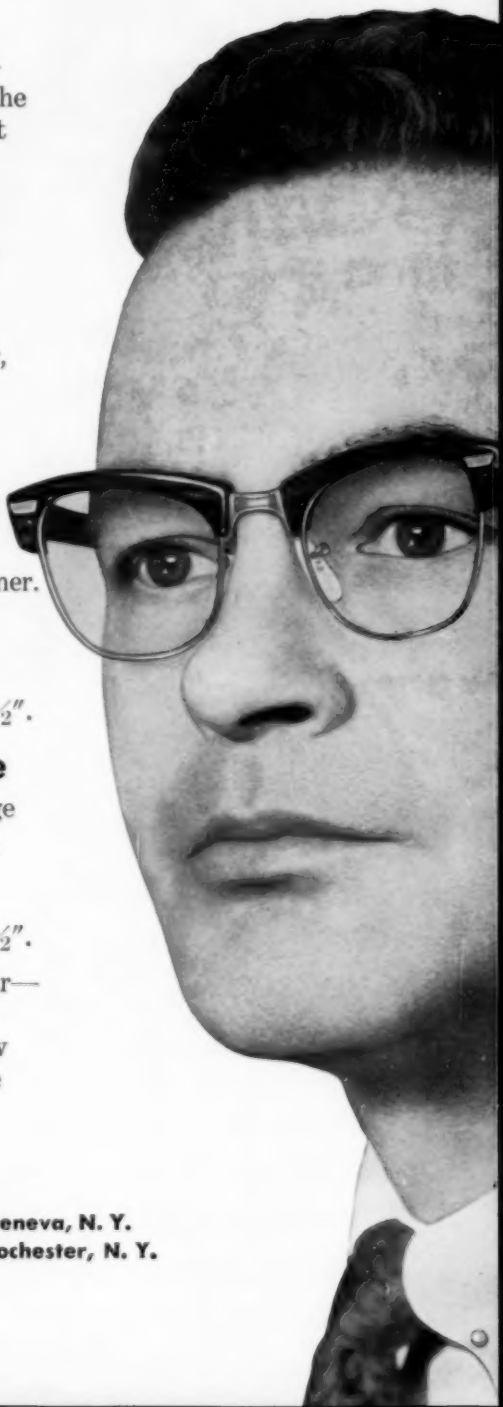
RONDEAN—Solid Zyl

The same restrained boldness, with front and
temple "cornered" together in the modern manner.
In Dusk Grey, Dusk Brown, Briar Grey,
Black Briar and Golden Briar: 44 to 48—
18 to 24; 50—20 to 24. Matching Academy
Temples (7-barrel) in all five colors, 5¼" to 6½".

RONDEAN—Clear Bridge

The same smart look in the popular clear bridge
style. In Dusk Grey, Dusk Brown, Briar Grey,
Black Briar and Golden Briar: 44 to 48—
18 to 24; 50—20 to 24. Matching Academy
Temples (7-barrel) in all five colors, 5¼" to 6½".

Now, for the first time in the history of eyewear—
from Shuron's complete line of men's frames—
you can offer your patients the same smart new
top and temple treatment in your choice of the
three styles you use most.

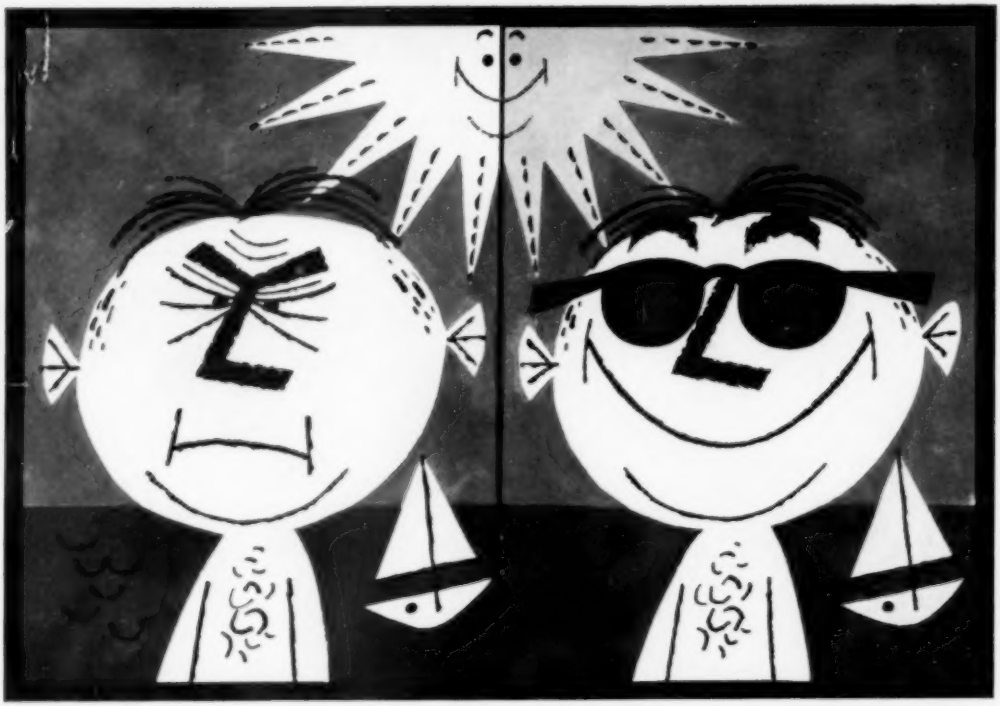


SHURON OPTICAL COMPANY SHURON **Geneva, N. Y.**
Rochester, N. Y.

frames, you can now offer

TEMPLE TREATMENT

IN ALL THREE STYLES



Patients enjoy better outdoor vision
when you suggest

"ADD A PAIR FOR OUTDOOR WEAR"

Your patients *need* Outdoor Glasses. And they realize this need. That's why there are 50 million pairs of ordinary sun glasses sold each year.

Cheap glasses—the kind many patients buy—frequently have irregular surfaces that distort vision and provide little or no protection against the sun's ultraviolet and infrared rays. AO lenses, on the other hand, are made to the highest ophthalmic standards and are available as plain lenses or ground to individual prescription.

When you prescribe the *right* glasses for outdoor wear you are performing a true service for your patients. There is nothing undignified or unprofessional in doing this. In fact, it should be done with every examination—particularly in the days just ahead when the need for *complete* eye protection outdoors is more important than ever.

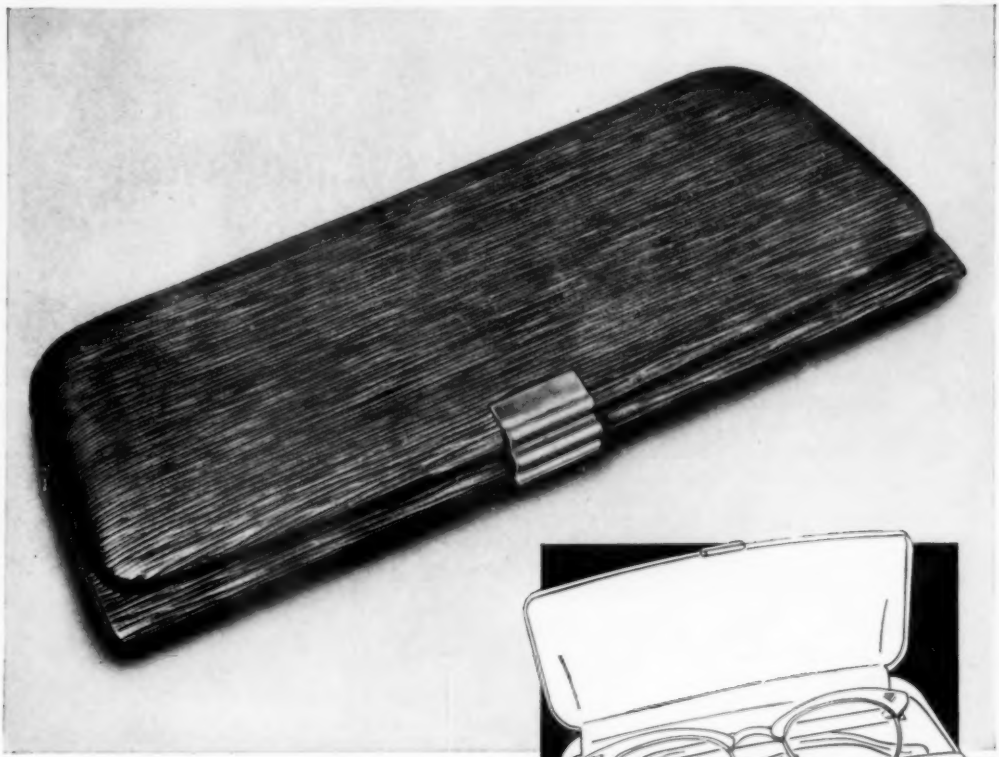
AO OUTDOOR GLASSES FOR EVERY NEED

True-Color—This is a neutral grey lens that tames the brightest sun yet keeps colors in their true relationship. *Cosmetan*—A tan lens—particularly effective in reducing vision-robbing haze. *Calobar*—A restful green lens that has been the leader in Outdoor Glass popularity for years.

Available through your AO Franchised Distributor or Local AO Branch.

American Optical
COMPANY

Since 1833... Better Vision for Better Living



Best Protection...

Smart New Design...Priced for Give-Away...

THE LIMELIGHT CASE—You can't beat the shell case for all-around protection. Now this old favorite is ready in a brand-new design . . . with gold and silver-threaded fabrics and a smart brass clasp that opens at a touch. Case closes just as tight as ever, too — so dust and lint can't get in . . . and its new aluminum shell is light as well as strong, especially suitable for combination frames. LIMELIGHT'S rich, ripple-textured finish comes in five luxurious colors: Blue, Grey, Ivory, Aqua, Maroon. To order, use the convenient coupon at the right.

PRICE: In quantities of 100—$.51 each
500-1000, less 5% 1000 or more, less 10%

Also available through your AO Franchised Distributor or Local AO Branch.

American Optical
COMPANY
Since 1833...Better Vision for Better Living

American Optical Company
Box 12, Southbridge, Mass., Dept. E

Please send me the following LIMELIGHT *Cases:*

COLOR	QUANTITY	COLOR	QUANTITY
Blue/Gold		Aqua/Gold	
Grey/Silver		Maroon	
Ivory/Gold			

NAME.....

STREET.....

CITY.....ZONE.....STATE.....

Provide complete patient satisfaction...

Prescribe year-round eye protection and comfort from outdoor glare!

More of your patient's time is being spent in out-of-doors activities than ever before. To better enjoy these activities, their eyes need and deserve the best possible protection from the direct rays of the sun and from the myriads of bright outdoor reflections.

Doctors who are aware of this vital need consider it their responsibility to provide the utmost in glare protection – and prescribe outdoor glasses as one of their regular professional services.

Provide patient satisfaction with *complete eye service.* Join the growing number of doctors who rely on BENSON craftsmen for fast, dependable, accurate service.

CHOOSE FROM BENSON'S COMPLETE STOCK!

Single vision and multifocal lenses available in — G15 • greens 2 and 3 • full lines of AO Calobars, Cosmetan and B & L Ray Bans • gradient densities • regular and large size lenses • hundreds of beautifully styled frames.

For an added margin of safety

... specify BENSON'S HARDRx Safety Lenses.

1913-1958 . . . Our 45th year • ***Executive Offices — Minneapolis 2, Minn.***

COMPLETE LABORATORIES CONVENIENTLY LOCATED IN UPPER MIDWEST CITIES

AMERICAN JOURNAL OF OPTOMETRY
and ARCHIVES *of*
AMERICAN ACADEMY OF OPTOMETRY

Vol. 36 May, 1959 No. 5

BRIGHTNESS CONTRAST, ILLUMINATION INTENSITY AND VISUAL EFFICIENCY*

Miles A. Tinker†
Department of Psychology, University of Minnesota
Minneapolis, Minnesota

During recent years illuminating engineers, psychologists, school administrators, optometrists, and the medical profession have become much concerned about illumination for effective and comfortable vision. An important area of discussion and research deals with illumination requirements for reading in situations that involve less than maximum brightness contrast between print and paper. It is generally accepted that the light intensity should be increased to achieve more effective vision when the brightness contrast is relatively small. Some writers hold the erroneous view that if the illumination is made intense enough, visual performance with a poor contrast between test object (or print) and background can be made to equal performance with a good contrast between test object and background.

To a large degree, levels of illumination intensity prescribed for efficient and comfortable vision have been based upon the relationship between visual acuity and illumination intensity or visibility (threshold perception) and illumination intensity. Furthermore, specific recommendations are frequently derived through statistical manipulation of visual acuity or visibility data rather than experimentally determined as such. Tinker[3] has pointed out the hazards of such procedures.

The present study is concerned with the relation between illumination intensity and the readability and visibility of print with variation in brightness contrast between printing ink and paper. Reading words in a meaningful context (sentences) is a structured situation. Quick perception of such words depends upon cues from total word form, the shape of letter complexes at the beginning of words, and the meaning context of the sentence in addition to some discrimination of letters. Consequently words need not be examined in minute detail in order to be recognized. The discrimination required is suprathreshold for the

*Submitted on October 24, 1958, for publication in the May, 1959, issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.
The writer is grateful to the University of Minnesota Graduate School for a research grant to finance this study.
†Psychologist, Ph.D., Member of faculty.

illumination levels used. Visibility measurements, which involve threshold discrimination of isolated words (one word at a time), require closer examination of the details of the letters in the words. Hence visibility measurements are somewhat analogous to visual acuity measurements. The two kinds of measurements employed in this study were: (1) speed of reading connected material (readability), and (2) visibility of isolated words by means of the Luckiesh-Moss Visibility meter.

In this study, the effect of variation in illumination intensity upon readability for material with different degrees of brightness contrast between printing ink and paper, will be in terms of speed of reading meaningful sentences. Similarly, the effect upon threshold perception will be in terms of visibility measurements. Comparison of the trends under these two conditions will yield information on readibility (actually speed of perception) when reading structured material in connected sentences versus threshold visibility. Actually the comparison is between normal reading and threshold discrimination. The results should permit conclusions regarding the illumination requirements for normal reading of materials with various degrees of brightness contrast between print and paper.

MATERIALS

Six short forms of the Tinker Speed of Reading Test[5] were used. Each form contained 15 items of 30 words each. Since comprehension was constant at about 99.6 per cent, the test virtually measures speed of perception in reading. Each form was printed with 10 point Excelsior type in a line width of 20 picas, and with 2 point leading on cover stock ranging from white to dark gray. The per cent reflectances* for paper and ink are:

Sample Paper	Paper Reflectance	Ink Reflectance	Brightness Difference**
White	0.80	0.044	0.756
Light Gray	0.62	0.039	0.581
Medium Gray	0.40	0.052	0.348
Dark Gray	0.23	0.013	0.217

**There was little difference in *relative* brightness contrast: 0.870 to 0.945.

For the visibility measurements, 24 five-letter words were cut out from the test. Each word was then mounted on a sheet of paper of the same degree of grayness as that upon which it was printed. There were six groups of four words each. A subject's visibility score was an average of the four readings.

METHOD

In Part I, the effects of varying light intensity upon readability and

*The writer is grateful to Dr. Sylvester K. Guth of the General Electric Laboratory, Cleveland, Ohio, for measurement of the reflectances.

visibility of print on white and dark gray paper were determined. Time was recorded in seconds for reading the 15 items (450 words) under each condition. Visibility measurements for four words were taken under the same conditions. Examination of the correlations in the following tables show that these amounts of reading material and words for visibility measurements were adequate for yielding reliable results. All testing was done individually in the Minnesota Light Laboratory. The light from 5 to 100 footcandles was indirect; from 200 to 400, indirect plus local. In the first part of the experiment 40 University students served as subjects in each of the four groups, 160 subjects in all. The four test groups follow:

Group Ia was a control group. For each subject, the speed of reading and visibility measurements were made under 25 footcandles of light for the six test forms and for the six groups of words printed on white paper. The results for Group Ia yielded data (Tables 1 and 2) for evaluation of the equivalence of the test forms and of the groups of words so that corrections could be made in the experimental groups.

Group II. Speed of reading and visibility measurements were made for each of the four brightness contrasts of printing ink and paper, all under 25 footcandles of light.

Group III. Similar measurements were made for print on white paper under 5, 25, 50, 100, 200, and 400 footcandles of light.

Group IV. Similar measurements were made for print on dark gray paper and for 5 through 400 footcandles of light.

The second part of the experiment consisted of measurements like those listed above for the control group and were for black print on light gray paper and also on medium gray paper. There were 69 subjects in each of the three test groups, 207 in all. Test groups Ib, V and VI.

RESULTS

Data for the control groups for the first part of the experiment are given in Table 1 and Table 2. The corrections in column 5 of Table 1 are to be applied to the data in Tables 5, 6, and 9. The minus corrections are subtracted from the mean score of the second form of the test used in a comparison; a plus correction is added. These corrections are made in order to make the two forms of the test equivalent. The corrections in column 5 of Table 2 are to be applied to data in Tables 10, 11, and 14 to equalize the difficulty of the groups of words compared for visibility.

In the second part of the experiment, which dealt with brightness contrasts between black print and light gray and medium gray paper, there were 69 subjects in each sub-group, 207 subjects in all. Correc-

TABLE 1

Control Group Ia for Speed of Reading

Note: Score is the time taken to read 15 test items (450 words) in black print on white paper under 25 footcandles of light. N = 40 university students. Differences are for score on first form minus score on second form in each comparison. Corrections in column 5 are to be used in Tables 5, 6, and 9. Minus corrections are to be subtracted from mean score on second form; plus corrections are added.

Test Form	Mean in Seconds	Difference Between Means	r	Correction
(1)	(2)	(3)	(4)	(5)
A1	83.55			
A2	89.60	+6.05	+0.93	—6.05
A1	83.55			
B1	80.95	—2.60	+0.81	+2.60
A1	83.55			
B2	80.60	—2.95	+0.80	+2.95
A1	83.55			
C1	75.38	—8.17	+0.83	+8.17
A1	83.55			
C2	76.95	—6.60	+0.77	+6.60

*Original computations for the whole study were carried to four decimal places.

TABLE 2

Control Group Ia for Visibility Measurement

Note: Visibility was measured for black print on white paper under 25 footcandles of light. N = 40 university students. Corrections in column 5 are to be used in Tables 10, 11, and 14 as outlined in note of Table 1.

Word Groups	Mean Visibility Score	Difference Between Means	r	Correction
(1)	(2)	(3)	(4)	(5)
V1-V4	3.41			
V5-V8	3.51	+0.10	+0.90	—0.10
V1-V4	3.41			
V9-V12	3.70	+0.29	+0.90	—0.29
V1-V4	3.41			
V13-V16	3.65	+0.25	+0.86	—0.25
V1-V4	3.41			
V17-V20	3.58	+0.18	+0.84	—0.18
V1-V4	3.41			
V21-V24	3.54	+0.14	+0.79	—0.14

tions for equating test forms and word groups were obtained with black print on white paper under 25 footcandles of light (Control Group Ib) as in the first part of the experiment. The corrections, which are to be applied to the data in Tables 7 and 8 for speed of reading, are given in column 5, Table 3. Similarly, the corrections to be applied to data in Tables 12 and 13 for visibility are given in column 5 of Table 4.

The data for speed of reading print on the papers of different degrees of reflectance and under 25 footcandles of light are given in Table 5. Note that the retardation in reading increases with the decrease in bright-

TABLE 3

Control Group Ib for Speed of Reading

Note: Black print on white paper was read under 25 footcandles of light. N = 69 university students. Corrections in column 5 are to be used in Tables 7 and 8 as outlined in note for Table 1.

Test Form	Mean in Seconds	Difference Between Means	r	Correction
(1)	(2)	(3)	(4)	(5)
A1	85.48			
A2	92.64	+7.16	+0.92	—7.16
A1	85.48			
B1	83.17	—2.30	+0.91	+2.30
A1	85.48			
B2	82.58	—2.90	+0.90	+2.90
A1	85.48			
C1	77.77	—7.71	+0.90	+7.71
A1	85.48			
C2	78.78	—6.70	+0.86	+6.70

TABLE 4

Control Group Ib for Visibility Measurements

Note: Black print on white paper was read under 25 footcandles of light. N = 69 university students. Corrections in column 5 are to be used in Tables 12 and 13 as outlined in note for Table 1.

Word Group	Mean Visibility Score*	Difference Between Means	r	Correction
(1)	(2)	(3)	(4)	(5)
V1-V4	3.30			
V5-V8	3.38	+0.09	+0.91	—0.09
V1-V4	3.30			
V9-V12	3.58	+0.28	+0.91	—0.28
V1-V4	3.30			
V13-V16	3.61	+0.31	+0.84	—0.31
V1-V4	3.30			
V17-V20	3.58	+0.28	+0.83	—0.28
V1-V4	3.30			
V21-V24	3.53	+0.23	+0.75	—0.23

*Original computations were carried to four decimal places.

ness contrast. However, the differences are not statistically significant for the first two comparisons. But the third, white versus dark gray, is retarded significantly at the 5 per cent level.

Table 6 shows the effect of changes of light intensity on speed of reading black print on white paper (brightness contrast of 0.756). Increasing the light intensity by steps from 5 to 400 footcandles had no significant effect on speed of reading.

Similar data for black print on light gray paper (brightness contrast of 0.581) are given in Table 7. Examination of the critical ratios in column 8 shows that speed of reading was increased significantly in going from 5 to 25, 50, 100, or 400 footcandles but not for 5 to 200 footcandles. In the latter, however, the difference (2.67 per cent im-

TABLE 5

Effect of brightness contrast upon speed of reading: Test Group II

Note: Illumination was 25 footcandles. N = 40 university students. The differences in column 5 are corrected by the appropriate amounts shown in column 5 of Table 1 as —6.05 for Test Form A1 versus A2, etc.

Test Form and Paper Brightness	Brightness Contrast	Mean in Seconds	SE_M	Corrected Difference Between Means in Seconds	Corrected Difference Between Means in Per Cent	r	D / SE_D
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A1. White	0.756	83.20	2.45				
A2. Light Gray	0.581	89.40	2.35	+0.15	+0.2	+0.76	+0.09
A1. White	0.756	83.20	2.45				
B1. Med. gray	9.348	82.43	2.37	+1.83	+2.2	+0.72	+1.01
A1. White	0.756	83.20	2.45				
B2. Dark Gray	0.217	84.48	2.55	+4.23	+5.1	+0.68	+1.97*

*Significant at 0.05 level.

TABLE 6

Effect of varying light intensity on speed of reading black print on white paper: Test Group III

Note: The brightness contrast between printing ink and paper was 0.756. N = 40 university students. The differences in column 5 are corrected by the appropriate amounts shown in column 5 of Table 1.

Test Form	Footcandles	Mean in Seconds	SE_M	Corrected Difference Between Means in Seconds	Corrected Difference Between Means in Per Cent	r	D / SE_D
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A1	5	76.50	2.78				
A2	25	81.98	3.22	—0.58	—0.8	+0.86	—0.35
A1	5	76.50	2.78				
B1	50	73.03	2.65	—0.88	—1.2	+0.88	—0.67
A1	5	76.50	2.78				
B2	100	72.68	2.97	—0.88	—1.2	+0.80	—0.47
A1	5	76.50	2.78				
C1	200	69.48	2.65	+1.15	+1.5	+0.86	+0.80
A1	5	76.50	2.78				
C2	400	68.95	2.69	—0.95	—1.2	+0.79	—0.53

provement) is in the expected direction and is consistent with the other differences.

The data for speed of reading black print on medium gray paper (brightness contrast of 0.348) are given in Table 8. Increasing the light intensity from 5 to 25, 50, 100 or 400 footcandles increases speed of reading significantly (column 8). Again a significant improvement is not indicated in going from 5 to 200 footcandles, although the 2 per cent faster reading is consistent with the direction of the other differences.

Results for reading black print on dark gray paper (brightness contrast of 0.217) are given in Table 9. Speed of reading increased significantly in going from 5 to 100 and 200 footcandles but not in going from 5 to 25, 50, or 400 footcandles.

TABLE 7

Effect of varying light intensity on speed of reading black print on light gray paper: Test Group V

Note: The brightness contrast between ink and paper was 0.581. N = 69 university students. The differences in column 5 are corrected by the appropriate amounts shown in column 5 of Table 3.

Test Form	Foot-candles	Mean in Seconds	SE_M	Corrected Difference Between Means in: Seconds	Per Cent	r	D / SE_D
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A1	5	92.44	2.99				
A2	25	96.32	3.01	—3.28	—3.54	+0.89	—2.35**
A1	5	92.44	2.99				
B1	50	85.88	2.59	—4.25	—4.59	+0.86	—2.74*
A1	5	92.44	2.99				
B2	100	83.83	2.44	—5.71	—6.18	+0.81	—3.27*
A1	5	92.44	2.99				
C1	200	82.26	2.51	—2.46	—2.67	+0.79	—1.34
A1	5	92.44	2.99				
C2	400	81.70	2.44	—4.04	—4.37	+0.75	—2.07***

*Significant at 0.01 level.
**Significant at 0.02 level.
***Significant between 0.02 and 0.05 level.

TABLE 8

Effect of varying light intensity on speed of reading black print on medium gray paper: Test Group VI

Note: The brightness contrast between ink and paper was 0.348. N = 69 university students. The differences in column 5 are corrected by the appropriate amounts shown in column 5 of Table 3.

Test Form	Foot-candles	Mean in Seconds	SE_M	Corrected Difference Between Means in: Seconds	Per Cent	r	D / SE_D
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A1	5	87.77	1.98				
A2	25	92.32	2.12	—2.61	—2.97	+0.79	—1.93***
A1	5	87.77	1.98				
B1	50	81.80	2.10	—3.67	—4.18	+0.81	—2.93*
A1	5	87.77	1.98				
B2	100	81.41	1.98	—3.46	—3.95	+0.73	—2.40**
A1	5	87.77	1.98				
C1	200	78.26	2.24	—1.80	—2.05	+0.76	—1.21
A1	5	87.77	1.98				
C2	400	78.19	2.16	—2.88	—3.29	+0.74	—1.91***

*Significant at the 0.01 level.
**Significant at the 0.02 level.
***Significant at the 0.05 level.

Critical ratios were also computed for the differences between successive steps from 25 footcandles through 400 (not shown in Tables). For all the speed of reading data, no significant differences were found for these comparisons.

General trends for the speed of reading data may be summarized as

TABLE 9

Effect of varying light intensity upon speed of reading black print on dark gray paper: Test Group IV

Note: The brightness contrast between ink and paper was 0.217. N = 40 university students. The differences in column 5 are corrected by the appropriate amounts shown in column 5 of Table 1.

Test Form	Foot-candles	Mean in Seconds	SE_M	Corrected Difference Between Means in: Seconds	Per Cent	r	D / SE_D
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A1	5	90.50	3.30				
A2	25	94.18	3.43	—2.39	—2.6	+0.83	—1.21
A1	5	90.50	3.30				
B1	50	85.03	3.24	—2.88	—3.2	+0.88	—1.76
A1	5	90.50	3.30				
B2	100	82.73	2.95	—4.83	—5.3	+0.83	—2.62*
A1	5	90.50	3.30				
C1	200	78.80	3.16	—3.53	—3.9	+0.90	—2.38**
A1	5	90.50	3.30				
C2	400	81.08	3.39	—2.83	—3.1	+0.83	—1.43

*Significant at the 0.01 level.
**Significant at the 0.02 level.

follows: (1) Speed of reading is gradually reduced as the brightness contrast between print and paper is reduced (Table 5). (2) Increasing illumination intensity beyond 5 footcandles has no important effect on speed of reading when the brightness contrast between printing ink and paper is large (i.e., 0.756). (3) With moderate degrees of contrast (0.581 and 0.348), speed of reading increases significantly in going from 5 to 25 footcandles of light, but becomes no greater when intensities above 25 footcandles are employed. (4) With low contrast (0.217), the light intensity must be raised from 5 to about 100 footcandles to get a significant increase in speed of reading. (5) From 25 footcandles up to 400 there is no significant difference, except for the 0.217 contrast (see above), in speed of reading for any brightness contrast when going from one intensity to another, i.e., from 25 to 50, 50 to 100, etc. (6) In general, it appears that, except for very low brightness contrast (0.217) between printing ink and paper, excessively high intensities of light are not necessary for quick perception in reading connected materials.

As we shall see, the visibility measurements present a somewhat different picture. The data for visibility measurements for variation in brightness contrast with illumination constant at 25 footcandles are given in Table 10. It appears (column 6 of the table) that visibility decreases consistently with reduction of brightness contrast between print and paper. The reductions vary from about 24 per cent to about 61 per cent and these differences are all statistically significant.

TABLE 10

Effect of brightness contrast upon visibility of print: Test Group II

Note: All visibility readings were taken with the Luckiesh-Moss Visibility Meter, under 25 footcandles of light. N = 40 university students. The differences in column 5 are corrected by the appropriate amounts shown in column 5 of Table 2.

Word Group and Paper Brightness	Brightness Contrast	Mean	SE_M	Corrected Differences Between Means in Vis. Score*	Per Cent	r	D / SE_D
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
V1-V4, White	0.756	3.56	0.14				
V5-V8, Light Gray	0.581	2.82	0.09	—0.84	—23.6	+0.93	—12.97
V1-V4, White	0.756	3.56	0.14				
V9-V12, Med. Gray	0.348	2.24	0.08	—1.62	—45.5	+0.73	—16.69
V1-V4, White	0.756	3.56	0.14				
V13-V16, Dark Gray	0.217	1.66	0.06	—2.16	—60.7	+0.80	—21.55

*All differences are significant at the 0.01 level.

TABLE 11

Effect of varying light intensity upon visibility of black print on white paper: Test Group III

Note: The brightness contrast between ink and paper was 0.756. N = 40 university students. The differences in column 5 are corrected by the appropriate amounts shown in column 5 of Table 2.

Word Groups	Footcandles	Mean	SE_M	Corrected Differences Between Means in Vis. Score*	Per Cent	r	D / SE_D
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
V1-V4	5	2.35	0.07				
V5-V8	25	3.53	0.13	+1.08	+ 46.0	+0.84	+12.92
V1-V4	5	2.35	0.07				
V9-V12	50	4.91	0.22	+2.27	+ 96.6	+0.81	+13.37
V1-V4	5	2.35	0.07				
V13-V16	100	6.22	0.33	+3.63	+154.5	+0.87	+13.65
V1-V4	5	2.35	0.07				
V17-V20	200	9.98	0.61	+7.46	+317.4	+0.66	+13.25
V1-V4	5	2.35	0.07				
V21-V24	400	12.45	0.73	+9.97	+424.3	+0.60	+14.35

*All differences are significant at the 0.1 level.

Changes in visibility with variation of light intensity with black ink on white paper (brightness contrast of 0.756) are consistent as shown in Table 11. Examination of columns 6 and 8 show that there is a significant increase in visibility with each increase of light intensity. Going from 5 to 400 footcandles, the visibility increases from 46 (5 versus 25 footcandles) to 424 per cent.

In a similar manner, data in Table 12 show the effect of light intensity upon visibility of black print on light gray paper (brightness contrast of 0.581). Again the data show a consistent and significant

TABLE 12

Effect of varying light intensity upon visibility of black print on light gray paper: Test Group V

Note: The brightness contrast between ink and paper was 0.581. N = 69 university students. The differences in column 5 are corrected by the appropriate amounts shown in column 5 of Table 4.

Word Groups	Foot-candles	Mean	SE_M	Corrected Differences Between Means in Vis. Score*	Per Cent	r	D / SE_D
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
V1-V4	5	1.88	0.05				
V5-V8	25	2.62	0.09	+0.66	+ 35.30	+0.83	+11.22
V1-V4	5	1.88	0.05				
V9-V12	50	3.40	0.11	+1.24	+ 66.07	+0.91	+18.87
V1-V4	5	1.88	0.05				
V13-V16	100	4.04	0.13	+1.85	+ 98.77	+0.78	+19.69
V1-V4	5	1.88	0.05				
V17-V20	200	6.29	0.28	+4.13	+220.26	+0.73	+17.00
V1-V4	5	1.88	0.05				
V20-V24	400	8.11	0.37	+6.01	+320.38	+0.70	+17.99

*All differences are significant at the 0.01 level.

TABLE 13

Effect of varying light intensity upon visibility of black print on medium gray paper: Test Group VI

Note: The brightness contrast between ink and paper was 0.348. N = 69 university students. The differences in column 5 are corrected by the appropriate amounts shown in column 5 of Table 4.

Word Groups	Foot-candles	Mean	SE_M	Corrected Differences Between Means in Vis. Score*	Per Cent	r	D / SE_D
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
V1-V4	5	1.56	0.02				
V5-V8	25	2.10	0.04	+0.46	+ 29.34	+0.83	+17.80
V1-V4	5	1.56	0.02				
V9-V12	50	2.61	0.05	+0.77	+ 49.49	+0.71	+19.20
V1-V4	5	1.56	0.02				
V13-V16	100	2.91	0.07	+1.04	+ 66.95	+0.74	+19.69
V1-V4	5	1.56	0.02				
V17-V20	200	3.98	0.11	+2.14	+137.29	+0.70	+21.78
V1-V4	5	1.56	0.02				
V21-V24	400	4.86	0.17	+3.08	+197.42	+0.63	+19.59

*All differences are significant at the 0.01 level.

increase in visibility at each step from 5 to 400 footcandles. The percentage increases range from about 35 to 320.

Data for black print on medium gray background (brightness contrast of 0.348) are given in Table 13. The increase in visibility of the print is consistently greater with each increase in illumination intensity but the increase is less marked than for the white and light gray paper. Increasing the intensity by steps from 5 to 400 footcandles produces

TABLE 14

Effect of varying light intensity upon visibility of black print on dark gray paper: Test Group IV

Note: The brightness contrast between ink and paper was 0.217. N = 40 university students. The differences in column 5 are corrected by the appropriate amounts shown in column 5 of Table 2.

Word Groups	Foot-candles	Mean	SE_M	Corrected Differences Between Means in Vis. Score*	Per Cent	t	D / SE_D
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
V1-V4	5	1.08	0.06				
V5-V8	25	1.50	0.04	+0.32	+ 29.6	+0.73	+ 7.12
V1-V4	5	1.08	0.06				
V9-V12	50	1.70	0.04	+0.33	+ 30.6	+0.69	+ 7.11
V1-V4	5	1.08	0.06				
V13-V16	100	2.04	0.07	+0.72	+ 66.7	+0.61	+12.54
V1-V4	5	1.08	0.06				
V17-V20	200	2.34	0.07	+1.08	+100.0	+0.60	+17.75
V1-V4	5	1.08	0.06				
V21-V24	400	2.74	0.10	+1.52	+140.7	+0.56	+19.19

*All differences are significant at the 0.01 level.

about 29 to 197 per cent increase in visibility. In each case this increase is significant.

Variation in visibility with changes of light intensity for black print on dark gray paper (brightness contrast of 0.217) is shown in Table 14. The increases in visibility range from about 30 to about 141 per cent. Again the percentage increase is less than for situations which have greater brightness contrast between print and paper.

The significance of the gains in visibility from one intensity to the next (as 5 to 25, 25 to 50, etc.) were computed for all comparisons with each brightness contrast (not shown in the Tables). In every instance the gain in visibility was significant.

The general trends for the data on visibility may be summarized as follows: (1) With illumination intensity held constant at 25 foot candles, visibility decreased consistently with reduction of brightness contrast between print and paper. (2) Increases in illumination intensity were accompanied by significant increases in visibility of print for each of the four contrasts in brightness employed. (3) The greater the brightness contrast between print and paper, the greater were the effects on visibility of increases in light intensity. In this experiment, this effect was directly proportional to the degree of brightness contrast.

DISCUSSION

The results obtained in this study raise an important question. Can measurements of threshold vision, such as visual acuity or visibility,

be employed as the sole or even the principal criterion for prescribing the appropriate illumination intensities for reading? Measurements of visual acuity and visibility require minute discriminaton of details by the subject. Furthermore, responses of the subjects continue to improve over a wide range of intensities. Lythgoe[2] found visual acuity improving up to and beyond 1000 footcandles. For Weston,[5] the curve of improvement was still rising at 500 footcandles. In the present study, visibility measurements were still rising at 400 footcandles. To a large degree, the illumination intensities specified for visual tasks including reading have either been based directly upon data derived from threshold discriminations or upon values derived by computations from such data. For instance, Luckiesh,[1] in considering the ideal footcandle level for reading black print on white paper with a reflectance of 80 per cent, states that a conservative brightness would be about 300 footlamberts (i.e., 375 footcandles). Tinker[4] has analyzed data from studies of visual acuity, visibility, and related studies. These data are referred to repeatedly in justifying the need of specific (high) intensities for reading and other visual work. Because these data, when plotted on a logarithmic scale produce approximately a straight line curve, it is claimed that high light intensities are justified for adequate visual performance. In his analysis, Tinker[4] points out that when the data are plotted on an arithmetical scale, apparent improvement disappears at around 100 footcandles. In another study, Tinker[3] points out the hazards of employing derived illumination specifications for practical, every day visual tasks. Such specifications do not agree with performance data for the same visual tasks. It would appear that it is a questionable practice to employ threshold measurements such as visual acuity or visibility scores, either directly or after applying some formula, for specifying lighting practice.

In the practical seeing situation, one is ordinarily dealing with supra-threshold discrimination. This is especially true for reading. The minute discrimination involved in visual acuity or visibility is not required for reading. Although a certain degree of discrimination is necessary for fastest perception of words in meaningful sentences, the illumination requirements are far less than for threshold discrimination.

The difference between illumination requirements for threshold and supra-threshold discrimination is well demonstrated by the results of the present study. Visibility increased with degree of brightness contrast when illumination was constant. It also increased with increase of illumination intensity for each set of material with a specific brightness contrast between print and paper. This increase continued up to and apparently beyond the highest intensity of 400 footcandles.

With speed of perception in reading the trends are quite different. With light intensity constant, the speed is reduced with decrease in brightness contrast between print and paper, but this decrease becomes significant only for the smallest amount of brightness contrast (0.217). With the best (highest) contrast (0.756), increases of light intensity from 5 to 400 footcandles had no significant effect. With a contrast of 0.581 (light gray paper), there is no significant increase in speed beyond 25 footcandles. The same is true for a contrast of 0.348 (medium gray paper). For the contrast of 0.217 (dark gray paper) the light intensity was raised from 5 to 100 footcandles before there was a significant increase in speed of reading. Except for this dark gray paper and the white paper (contrast of 0.756), there was, in general, an increase in speed of perception in reading when going from 5 to 25 footcandles but no further increases for the higher intensities. Thus the contrast between visibility responses and speed of perception in reading becomes obvious. Illumination intensities above 25 footcandles produce no significant change in speed of perception in reading except for the 0.217 contrast. However, visibility continues to increase by significant amounts for each increase in light intensity up to at least 400 footcandles. These increases are large in amount.

Another point should be emphasized. As the brightness contrast between print and paper decreases, increasing the light intensity has less and less effect. Thus for the greatest contrast (0.756), visibility increased by 424 per cent in going from 5 to 400 footcandles. But with the poorest contrast (0.217), the increase was only about 141 per cent in going from 5 to 400 footcandles. This supports Weston's[6] statement that however high the illumination intensity is made, performance with a poor contrast between print and paper can never be made to equal performance with good contrast. This is opposed to the view of some writers who state that merely increasing illumination intensity where there is poor contrast will result in visual discrimination equal to that which is possible with good contrast.

It is now possible to state some tentative conclusions concerning the intensity of light required for adequate vision in the reading situations that involve varying degrees of brightness contrast between print and paper. In measurements which involve threshold discrimination (visibility and also visual acuity), one can get increases in proficiency up to and beyond 400 (or 500 or even 1000) footcandles. Obviously such measurements cannot indicate clearly the intensity level beyond which one need not go for adequate vision in reading. Nor is it safe to compute from these threshold measurements by use of formulas the optimal light intensity for reading.

A carefully controlled measurement of speed of perception in reading (i.e., speed of reading with comprehension virtually 100 per cent and constant) seems to be about the best technique for use in studies of illumination requirements (and also for legibility differences for printed materials). While this technique may not be ideal, this study and others suggest that it is superior to other methods.

The data in this experiment suggest that about 25 footcandles of light is adequate for reading good book print when the brightness contrast is medium or high. For poor contrasts, an intensity of somewhere between 50 and 100 footcandles is needed. It might be noted that other research has shown that relatively high intensities of light (35 to 100 footcandles) are necessary for adequate vision when reading material is printed in certain non-optimal typography or when the reader does not have normal vision (as with presbyopes). In this paper, the objective has been to evaluate speed of perception in reading versus visibility as techniques for determining the illumination requirements for adequate vision in reading under varying degrees of brightness contrast between print and paper.

SUMMARY AND CONCLUSIONS

1. The present study was undertaken to determine the effects of illumination intensity upon visual efficiency with variations in brightness contrast between print and paper.

2. The test materials were printed on paper of different reflectances so that the brightness contrasts were 0.756, 0.581, 0.348, and 0.217.

3. Illumination intensities employed were 5, 25, 50, 100, 200, and 400 footcandles.

4. The subjects tested were 367 university sophomores.

5. Visibility of print and speed of reading were measured under each condition of light intensity and brightness contrast.

6. Speed of reading was gradually reduced as the brightness contrast between print and paper was reduced with illumination constant at 25 footcandles.

7. Increasing illumination intensity above 5 footcandles had no important effect upon speed of reading when the brightness contrast between print and paper was large (0.756).

8. With contrasts of 0.581 and 0.348, speed of reading increased when going from 5 to 25 footcandles but not for greater intensities.

9. With very poor contrast (0.217) the light intensity had to be raised from 5 to somewhere between 50 and 100 footcandles to get a significant increase in speed of reading. (No intensities between 50 and 100 footcandles were used.)

10. For 25 to 400 footcandles of light there was no significant increase in speed of reading with increase in light intensity (except as stated just above).

11. In general, it appears that, except for very poor brightness contrasts between print and paper, excessively high intensities of light are not necessary for quick perception in reading connected material.

12. With illumination constant at 25 footcandles, visibility for single words decreases consistently and by significant amounts with reductions in brightness contrast between print and paper.

13. With all degrees of brightness contrast, visibility increased consistently with each increase in illumination intensity used. These increases were directly proportional to the brightness contrast of the printed materials.

14. It is suggested that visibility scores which involve threshold discrimination should not be employed as a basis for specifying illumination levels satisfactory for reading. Because of the nature of visibility measurement (and other techniques which involve threshold discrimination), there is no way to determine the difference between adequate and surplus light in situations that involve supra-threshold vision as in reading.

15. The data suggest that even extreme increases in illumination intensity with poor contrast between print and paper cannot make the reading material as visible as reading material with good contrast between the print and paper.

16. Although not ideal, speed of perception in reading would appear to be a more satisfactory criterion for specifying illumination levels adequate for efficient vision in reading.

17. It seems reasonable to suggest that, in situations involving supra-threshold visual discrimination such as reading, illumination levels for efficient performance be determined for each specific situation. There are no trustworthy data in this or in any other published experiments which indicate that the specifications for illumination derived from threshold data, such as visual acuity or visibility measurements, are valid.

REFERENCES

1. Luckiesh, Matthew. Footcandle levels: threshold, ideal, optimum recommended. Illuminating Engineering, 43 (4): 395-411, 1948.
2. Lythgoe, R. J., The Measurement of Visual Acuity. London, H. M. Stationery Office, 1932. Medical Research Council, Special Report.
3. Tinker, Miles A., Derived illumination specifications. J. Applied Psych., 35: 377-380, 1951.
4. Tinker, Miles A., Interpretation of illumination data. Am. J. Optom. and Arch. Am. Acad. Optom., 29 (6): 293-300, 1952.

5. Tinker, Miles A., Tinker Speed of Reading Test. Minneapolis, Minn., University of Minnesota Press, 1955.
6. Weston, H. C., The Relation Between Illumination and Visual Efficiency: the Effect of Brightness Contrast. London, H. M. Stationery Office, 1945. Medical Research Council, Industrial Health Research Board, Report No. 87.

ANNOUNCEMENT

NATIONAL SCIENCE FOUNDATION FELLOWSHIPS

The National Science Foundation offers fellowships for graduate study in the sciences, including basic medical sciences, but not including studies of a clinical nature. Programs of graduate study in physiological optics, as offered at Indiana University, The Ohio State University, and the University of California, may be considered to fall within the purview of the National Science Foundation fellowship program if the individual plan of study is non-clinical in nature.

Optometry graduates working to pursue graduate study toward the M.S. or Ph.D. degree in Physiological Optics may be eligible to apply under either of the following categories:

Graduate (Predoctoral) Fellowships (Annual Awards).

These are available for students studying for master's or doctor's degrees. They are designed to provide support to usually able students to allow them to complete their graduate studies with the least possible delay. Applicants are required to take examinations testing scientific aptitude and scholastic achievement. Each applicant's plan of study will be judged individually. Tenure: One academic year (9 months) or a full year consisting of the academic year plus a summer session. Stipends: At the rate of $1,800 to $2,200 annually, depending upon whether the fellowship is first year, intermediate, or terminal year; plus allowance for dependents, tuition, and travel.

Cooperative Graduate Fellowships (Annual Awards).

To enable universities to participate in the selection of some predoctoral Fellows, the Foundation has established this program to complement the regular predoctoral fellowship program. An applicant for a cooperative graduate fellowship applies through the participating institution he expects to attend as a Fellow. Initial screening and evaluation are accomplished by the institution's faculty, with final evaluation and selection by NSF. Tenure: One regular academic year or a full year consisting of the academic year plus a full summer session. Stipends: At the rate of $2,200 per annum, plus allowance for tuition, fees, and other expenses.

Forms and instructions for making application for these fellowships are available from: National Science Foundation, Fellowships Section, Washington 25, D. C.

THE USE OF HIGH-ADD BIFOCALS IN CASES OF LOW VISUAL ACUITY*

John Zettel, Jr.†
Cincinnati, Ohio

It has been pointed out by Fry[1] and Koch,[2] that the majority of patients seeking eye or vision care in this country screen themselves as to whether they need the care of an optometrist or an ophthalmologist. Thus, optometrists mainly see patients who are experiencing gradual changes in their vision the causes of which are usually refractive rather than acute pathological conditions. In most instances when a patient does not have enough vision to read the Snellen 20/200 letters, he will either seek or be referred to an ophthalmologist for an opinion as to the cause of trouble. Thus, the average optometrist encounters very few patients whose vision is this poor.

However, it is not unusual for an optometrist in his daily practice to see patients whose vision with best correction ranges from 20/40 to 20/100. The care which may be given to these patients can be very satisfying as far as supplying optical aids that will fulfill their visual needs. The number of patients falling in this category is more than enough to warrant the extra time and effort needed not only to become familiar with the special techniques for examining them, but also to gain knowledge of what optical aids are available to help them.

One of the best and least costly of those optical aids is the high-add bifocal, or a bifocal which has a higher dioptric power than would be prescribed for a person having normal vision for a conventional task. This increased power of the lens requires the patient to hold the near point work at a closer distance, depending on the level of his visual acuity. The poorer his visual acuity, the closer the near work must be held in order to give enough magnification for satisfactory vision. When the work is held too close for convergence to operate, we must do one of two things. The patient can be given base-in prism in the lenses or we can rely on monocular vision. The latter is probably what the patient will do anyway, even if it is not intended, since enough prism usually cannot be supplied in his correction for comfortable fusion.

It is very helpful for the patient as well as the optometrist if high-add bifocals can be fitted in gradual steps, starting when the acuity first

*Read before the annual meeting of the American Academy of Optometry, Boston, Massachusetts, December 15, 1958. For publication in the May, 1959, issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.

†Optometrist. Fellow, American Academy of Optometry.

begins to decline and increasing the addition as the vision becomes less. This enables the patient to adjust gradually to the changing conditions to which he is being subjected. Such a procedure may be necessary even if the add is not quite sufficient. Often beginning with the addition that would seem to be required will be too radical a change. It is best to begin with the weakest add, or one which seemingly is almost too weak, and if necessary to increase the power later as the patient learns to change his habits and ideas as to what his limitations are or what help is necessary to fill his needs.

The idea of increasing the power of the near point correction so that the task can be held closer to the eyes and thus magnify the object being viewed is not new, but it seems that recently there has been more thought given to the subject. Feinbloom, Kolmorgan and many others have contributed immeasurably, not only to the development of this type of aid for partially sighted individuals, but with new adaptations of telescopic and microscopic spectacles. Companies like Continental Optical Company and American Optical Company have expanded further with the idea of microscopic lenses, making them available in the form of an high-add bifocal which many patients can wear constantly.

Continental has made its high-add bifocals in three different sizes: 32 mm., 26 mm., and 22 mm. in diameter. Additions of 5.00, 6.00, 7.00 and 8.00 D. are available in the 32 mm. bifocal: the 10.00 and 12.00 D. add in the 26 mm. one: and all of these additions including 16.00 and 20.00 D. in the 22 mm. size. By decreasing the size of the field as the power is increased, there is less aberration. The 22 mm. bifocal has in the past proven to be a very satisfactory one, from the standpoint of both appearance and use. When these high-add bifocals are made into a conventional pair of spectacles, the weight is about the same as a fused bifocal. Even in the higher adds such as 10.00 and 12.00 D., the appearance is not noticeably different. The new 26 mm. one-piece bifocal will be a useful addition to the 22 mm. one for those patients demanding a wider field of vision: however, this will be more noticeable and slightly heavier, but not nearly so much as the 32 mm. one.

Appearance and weight are very important considerations. Optometrists think mainly of size of field, spherical aberration, and other distortions. These, of course, are important but the practitioner should not lose sight of the desires of the patient. One of the first things most patients think about is how the finished lenses look and how heavy they are. Consequently these latter factors should be considered.

American Optical Company is supplying one-piece bifocal lenses

with the reading additions available in powers of 8.00, 16.00, 24.00, 32.00, and 40.00 D. All of these have circular reading adds 25 mm. in diameter, except the last which has a diameter of 15 mm. Also, unlike the others, it can not have a distance correction incorporated in the upper part of the lens. These lenses differ from the Continental bifocals in that the segments are on the front rather than the back of the lens. This construction makes them somewhat more conspicuous. They do, however, have a much higher range in power and therefore can be used for patients whose needs would range beyond those helped by the 20.00 D. bifocal.

The newest development by American Optical Company is the Aolite microscopic lens. These new lenses are all plastic with the added power on the back instead of the front. They are available in three different powers, and each has a different size. The powers are 32.00, 40.00, and 48.00 D. and they are 33, 29, and 25 mm. in diameter, respectively. These lenses are not intended for use as bifocals. It is recommended that the near point addition be set high with the center of the add not more than 3 mm. below the geometric center of the finished lenses so that the patient will be looking along the optical axis of the add when using it.

One advantage of these lenses is the reduction in weight as compared to ophthalmic glass but in addition to this they give a wider field of vision, are available in higher powers and, like the other lenses discussed, are low in cost. The disadvantages are that they could not be worn constantly as are conventional bifocals because of the size and position of the add, and, the distance correction cannot be incorporated in the other part of the lens.

The examining procedure for a patient with low vision should be varied somewhat from that used for a patient with normal vision. Care should be taken not to emphasize the fact that low vision is present. This may be done by using testing letters which can be seen without great difficulty and then making greater changes than the customary 0.25 D. during the subjective examination. This is in reference not only to checking the spherical correction but also the astigmatism.

The spherical correction can be determined by the following procedure. A device (Figure 1) can be made by mounting two lenses, a plus lens and a minus lens of equal power, so that they can be flipped from one lens to the other before the eye being tested. If the chart looks clearer with the plus lens, the spherical subjective correction would be increased if it is a hyperopic correction, or decreased if it is a minus lens power. If the chart looks clearer through the minus lens of the

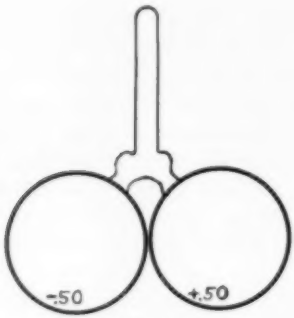


Fig. 1

device, a plus lens correction would be decreased or minus increased slightly. This procedure is repeated until the patient sees the chart with equal clearness with the minus or plus lenses of the testing device. At least three sets of these should be available in powers of 0.25, 0.50, and 1.00 D., and when making the subjective examination the one which would make a noticeable difference in the clearness of the chart should be used. If a patient's visual acuity is between 20/30 and 20/60, the +0.25 D. and —0.25 D. lenses should be used; if it is between 20/60 and 20/200 the +0.50 D. and —0.50 D.; and, if the vision is 20/200 or less the +1.00 D. and the —1.00 D. This same procedure can also be used in correcting astigmatism.

Cross-cylinders which have the powers of 0.25, 0.50, 0.75, and 1.00 D. should be used regularly for testing for the same reasons as those given in testing the spherical correction. When determining the amount of astigmatism, the suggested procedure is slightly different. When the visual acuity is between 20/40 and 20/80 the 0.50 D. cross-cylinder should be used; between 20/80 and 20/200, the 0.75; and 20/200 or less, the 1.00 D. The approximate spherical correction is first determined using the double spherical lenses as described before. Then, the astigmatic lens power needed is approximated using the cross-cylinder with a power dependent on the acuity as described above. The spherical lens is then again redetermined and then the astigmatic power is rechecked and so on, until no difference is found on rechecking. If, while this is being done, the acuity is improved, the testing lenses should be reduced to the power which corresponds to the degree of vision which the patient has.

After the subjective examination is completed and the best possible visual acuity is obtained, the binocular finding can then be taken in much the same manner as with a person having normal vision, except that

more time should be taken and larger letters should be used so the patient will not be confused by letters which are too small to read easily. The factor of time should be stressed for all parts of the examination. The poorer the vision the more difficult it will be for the patient to decide how to answer the examiners questions. It is advisable, if the examination cannot be completed in an hour, that the patient be asked to return for a post-refraction.

The near point examination is probably more important than that for distance, as far as the usable improved vision for the patient. At the near point much higher degrees of magnification are possible than at the far point. One of the first problems to consider is the distance at which the patient's reading matter will have to be in order to gain enough magnification to perform the desired task. This is decided by two main factors: first, the best visual acuity which was possible by the better eye at the conclusion of the subjective examination; and second, the size of the near point task. Lebensohn,[3] and Day[4] indicate that a person needs a visual acuity of at least 20/50 in order to read a newspaper at 14 inches, 20/40 for a telephone directory, and 20/60 to read a magazine or type-written material. In other words, if a patient has 20/100 and desires to at least be able to read a newspaper, the print would need to be enlarged to at least twice its size at 14 inches. Considering this, the near point examination should be made at about 7 inches. The magnification in this case is achieved by reducing the distance from the object to the eye, and since the desired magnification was two, the reading distance was reduced to one-half.

Linksz quotes Kestenbaum's[5] method for computing this factor which is somewhat the same except that the working distance is in centimeters instead of inches which makes it convenient to compute the power of the add. As an illustration, a patient with 20/20 vision should be able to read letters which subtend an angle of 5 minutes at a distance of one meter; therefore, if a patient had 20/80 vision he would have 1/4 vision at one meter, and would have to hold the 20/20 letters at 1/4 of a meter or 25 cm. in order to read them. If he has no accommodation, and has his distance error corrected, this person would then need a reading addition with a power of 4.00 D. to bring the letters into focus.

The near point examination can thus be started with the near point card placed at a distance which has been calculated by taking into consideration the factors of the corrected visual acuity at distance, the near point task and the amount of accommodation which the patient has. It may not be possible to do the near point examination binocularly,

however, as the test card may have to be placed too close for the eyes to converge for fusion. In this event the test should be done monocularly. The cross cylinders can be used monocularly, at the computed working distance of the better eye and an approximate add determined. The power of the add may be checked by using the plus and minus lens to blur technique, a reading chart located at the same distance as the cross-cylinder target, and letters which correspond in size to the needs of the patient. If the acuity is 20/50 or better, this consideration of the needs of the patient will probably not be too much of a problem but if the acuity is worse than this it may be important to select the size of the testing letters that will correspond to the print or near task which the patient finds it necessary to see or desires to do in his every day life.

The measurement of the phoria and the fusional reserves should be done after the suitable add is found. These measurements will determine the possibility of binocular vision at the near point. This varies with each individual even more than among patients with normal vision because those with reduced acuity sometimes do not have an adequate stimulus for fusion. In the majority of cases the visual acuity is much poorer in one eye than the other, and no matter how much consideration is given to binocular vision the poorer eye will be suppressed and the patient will simply rely on his good eye.

It is best, however, when it is possible, to strive to give the patient binocular vision. This may be done at times by decentering the lenses or by incorporating prism in the reading lenses if the convergence ability is not sufficient and it is sometimes effective in gaining fusion even at a fairly close range. Fonda,[6] writes that this may sometimes be done with additions as high as 10.00 D. in bifocals, or in regular lenses or half-eye lenses. He also stresses the importance of decentration of the lenses and states that a rule of thumb which can be used for this is one millimeter of decentration for each diopter of reading addition.

Another method which has been used by the writer for achieving binocular vision is the Benjamin Franklin type of bifocal. Two half lenses are placed together in a frame, the upper being the distance correction and the lower half the reading lens with usually a prism incorporated in it to compensate for the lack of convergence ability. This has been used not only for those with poor vision, but for persons with normal vision to meet occupational needs such as engraving, diamond setting, or other jobs requiring a working distance of from five to ten inches. This arrangement makes it possible to give the person his best distance vision and still incorporate a high-degree of prism in the bifocal without interference to the distance correction. The use of a full reading

lens also has the same advantage over regular bifocals in that a high degree of convergence help can be given.

The type and degree of illumination which the patient uses is also very important. As an example, where there is a cloudiness of media of the eye it is essential that the light not be reflected into the eyes directly because of the diffusion caused by the particles causing the cloudiness. Foxwell and Stevens[7] pointed out that even for persons with normal visual acuity the efficiency of the eye is considerably altered by changes in the levels of luminance and background. Consequently it seems even more imperative that a patient with low vision be tested with different degrees of illumination to illustrate what set of condition may be best for him.

TABLE 1

Minimum Magnification for Newsprint
or 20/40 V.A. = No Accommodation-Magnification = 1

Acuity	Calculated Add	Reading Distance (Inches) (Calculated)	Min. Mag.	Suggested Addition (Diopters)	Optical Aid Suggested By Author
20/40	2.50 D.	16 "	1	2.50- 3.00	Any Bifocal or Reading Lens
20/60	3.50 D. (approx.)	12 "	1.5	3.00- 3.50	Any Bifocal or Reading Lens
20/80	5.00 D.	8 "	2	4.00	22, 26, or 32 mm. One-Piece Bifocal or Reading Lens
20/100	7.00 D.	6.4"	2.5	6.00	22 or 26 mm. One-Piece Bifocal or Reading Lens
20/200	12.00 D.	3.2"	5	8.00-12.00	22 mm. One-Piece Bi. or 2x Microscopic Lens
20/400	25.00 D.	1.6"	10	12.00-16.00	22 mm. One-Piece Bi. or 4x Micro. Lens or Telescopic Lens
20/800	50.00 D.	0.8"	20	32.00	8x Microscopic Lens or Telescopic Lens

In conclusion reference can be made to Table 1 for a determination of the optical help available for the low vision patient. The acuity listed refers to the maximum visual acuity of the better eye after correction. The suggested addition refers to the minimum addition over and above the distance correction which should be given to the patient at the beginning of his care.

612 ENQUIRER BLDG.
CINCINNATI, OHIO

REFERENCES

1. Fry, Glenn A., The division of labor between optometry and ophthalmology. Am. J. Optom. and Arch. Am. Acad. Optom., 34 (3): 150-156, 1957.
2. Koch, Carel C., Aspects of interprofessional relationships. Am. J. Optom. and Arch. Am. Acad. Optom., 35 (2): 83-99, 1958.

3. Lebensohn, James E., Scientific and practical considerations involved in the near-vision test with presentation of a practical and informative near-vision chart. Am. J. Ophth., 19 (2): 110-117, 1936.
4. Day, Jim H., Refraction in cases of subnormal vision. Archivos de la Sociedad Americana de Oftalmologia y Optometria, 1 (1): 99-107, 1958.
5. Linksz, Arthur, Visual aids for the partially sighted. Am. J. Ophth., 41 (1): 30-41, 1956.
6. Fonda, Gerald, Binocular corrections for low vision. Am. J. Ophth., 45 (1): 23-27, 1958.
7. Foxell, C. A. P. and W. R. Stevens. Measurements of visual acuity. Brit. J. Ophth., 39 (9): 513-533, 1955.

BIBLIOGRAPHY

Bannon, Robert E., Physiological factors in multifocal corrections. Am. J. Optom. and Arch. Am. Acad. Optom., 32 (2): 57-69, 1955; 33 (4): 171-188, 1956.
Bettica, Louis J., Optical aids for persons with residual vision. Brit. J. Physiol. Opt., 12 (2): 99-105, 1955.
Bier, Norman, The correction of subnormal vision: a new development. Brit. J. Physiol. Opt., 12 (3): 167-181, 1955.
Ellerbrock, Vincent J., The optics of magnifying subnormal vision devices. Am. J. Optom. and Arch. Am. Acad. Optom., 35 (6): 300-308, 1958.
Levi, George A. and John H. King, Jr., Evaluation of certain optical devices in the correction of subnormal vision. Am. J. Ophth., 40 (1): 29-34, 1955.
Sloan, Louise L. and Adelaide Habel, Reading aids for the partially blind. Am. J. Ophth., 42 (6): 863-872, 1956.
Stimson, Russell L., Optical Aids for Low Acuity. Los Angeles, Calif., Braille Institute of America, 1957.

ANNOUNCEMENT

SUMMER GEOMETRIC OPTICS COURSE AT INDIANA UNIVERSITY

A one month intensive course in geometric optics is offered in the Indiana University 1959 Summer Session (June 10-July 10). This course, entitled *Optometry V321, Geometric Optics I*, is the first half of the full year geometric optics course regularly included in the optometry curriculum. The schedule will include seven class hours and 14 laboratory hours of attendance per week. Enrollees will not be permitted to carry any other work. Satisfactory completion will entitle the student to four semester hours of credit. A detailed description of the course may be obtained by writing to the Director, Indiana University, Division of Optometry, Bloomington, Indiana.

It is planned to offer the second semester of the full year course (Optometry V322) in the 1960 Summer Session.

Students from other optometry schools may enroll in the course for credit as "summer only" students. It is only necessary that the student submit a statement from an official of his optometry school certifying as to his good standing. Other students must file application for admission to Indiana University and submit transcripts from high school and from all colleges attended.

REFRACTING PATIENTS WITH AN OVER ACTIVE CILIARY—A CASE REPORT*

Marshall V. Mark†
Massachusetts College of Optometry
Boston, Massachusetts

The patient with an over-active ciliary mechanism is not uncommon. He is one who has an instability of accommodation which results in a variable, unreliable measurement of the existing ametropia, usually hypermetropia. The degree of hypermetropia is often, but not always, of the order of two to five diopters. The present paper is a consideration of a suggested technique for refracting such patients.

Static refraction techniques demand that the patient's accommodation be relaxed and this through the proper use of lenses, under the control of the examiner. Ideally, accommodation would equal zero during such tests. However, in examining a patient with an over-active ciliary it is not unusual for the optometrist to observe retinoscopic shadows which fluctuate from a with motion to an against motion, to neutrality and back to with. This happens whenever a slight change of the lens before the eye being examined is made or when the eye continues to look at the fixation target through the same lens or through no lens. With such a patient the routine subjective manifest refraction usually proves to be unreliable.

Over-activity of accommodation is frequently observed in the eyes of children or young adults. Such patients usually are wearing no correction for the existing ametropia or they are only in part corrected. These people often are troubled to varying degrees by asthenopia, although sometimes they are symptom-free. Obtaining consistent, reliable refractive findings can prove to be difficult. Refracting such patients after the instillation of a cycloplegic usually results in a reliable gross finding. However, at the time of the post-cycloplegic refraction the examiner encounters the same variable, unreliable refractive conditions just described, especially in uniocular testing.

The following is a case report which will help to explain the author's technique for refracting such patients. The case is not presented because it is in itself unique but because the approach is usually helpful in handing other similar cases.

*Read before the annual meeting of the American Academy of Optometry, Section on Aniseikonia and Refractive Problems, Boston, Massachusetts, December 14, 1958. For publication in the May, 1959, issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.
†Optometrist. Member of faculty. Fellow, American Academy of Optometry.

3. Lebensohn, James E., Scientific and practical considerations involved in the near-vision test with presentation of a practical and informative near-vision chart. Am. J. Ophth., 19 (2): 110-117, 1936.
4. Day, Jim H., Refraction in cases of subnormal vision. Archivos de la Sociedad Americana de Oftalmologia y Optometria, 1 (1): 99-107, 1958.
5. Linksz, Arthur, Visual aids for the partially sighted. Am. J. Ophth., 41 (1): 30-41, 1956.
6. Fonda, Gerald. Binocular corrections for low vision. Am. J. Ophth., 45 (1): 23-27, 1958.
7. Foxell, C. A. P. and W. R. Stevens. Measurements of visual acuity. Brit. J. Ophth., 39 (9): 513-533, 1955.

BIBLIOGRAPHY

Bannon, Robert E., Physiological factors in multifocal corrections. Am. J. Optom. and Arch. Am. Acad. Optom., 32 (2): 57-69, 1955; 33 (4): 171-188, 1956.
Bettica, Louis J., Optical aids for persons with residual vision. Brit. J. Physiol. Opt., 12 (2): 99-105, 1955.
Bier, Norman. The correction of subnormal vision: a new development. Brit. J. Physiol. Opt., 12 (3): 167-181, 1955.
Ellerbrock, Vincent J., The optics of magnifying subnormal vision devices. Am. J. Optom. and Arch. Am. Acad. Optom., 35 (6): 300-308, 1958.
Levi, George A. and John H. King, Jr., Evaluation of certain optical devices in the correction of subnormal vision. Am. J. Ophth., 40 (1): 29-34, 1955.
Sloan, Louise L. and Adelaide Habel, Reading aids for the partially blind. Am. J. Ophth., 42 (6): 863-872, 1956.
Stimson, Russell L., Optical Aids for Low Acuity. Los Angeles, Calif., Braille Institute of America, 1957.

ANNOUNCEMENT

SUMMER GEOMETRIC OPTICS COURSE AT INDIANA UNIVERSITY

A one month intensive course in geometric optics is offered in the Indiana University 1959 Summer Session (June 10-July 10). This course, entitled *Optometry V321, Geometric Optics I,* is the first half of the full year geometric optics course regularly included in the optometry curriculum. The schedule will include seven class hours and 14 laboratory hours of attendance per week. Enrollees will not be permitted to carry any other work. Satisfactory completion will entitle the student to four semester hours of credit. A detailed description of the course may be obtained by writing to the Director, Indiana University, Division of Optometry, Bloomington, Indiana.

It is planned to offer the second semester of the full year course (Optometry V322) in the 1960 Summer Session.

Students from other optometry schools may enroll in the course for credit as "summer only" students. It is only necessary that the student submit a statement from an official of his optometry school certifying as to his good standing. Other students must file application for admission to Indiana University and submit transcripts from high school and from all colleges attended.

REFRACTING PATIENTS WITH AN OVER ACTIVE CILIARY—A CASE REPORT*

Marshall V. Mark†
Massachusetts College of Optometry
Boston, Massachusetts

The patient with an over-active ciliary mechanism is not uncommon. He is one who has an instability of accommodation which results in a variable, unreliable measurement of the existing ametropia, usually hypermetropia. The degree of hypermetropia is often, but not always, of the order of two to five diopters. The present paper is a consideration of a suggested technique for refracting such patients.

Static refraction techniques demand that the patient's accommodation be relaxed and this through the proper use of lenses, under the control of the examiner. Ideally, accommodation would equal zero during such tests. However, in examining a patient with an over-active ciliary it is not unusual for the optometrist to observe retinoscopic shadows which fluctuate from a with motion to an against motion, to neutrality and back to with. This happens whenever a slight change of the lens before the eye being examined is made or when the eye continues to look at the fixation target through the same lens or through no lens. With such a patient the routine subjective manifest refraction usually proves to be unreliable.

Over-activity of accommodation is frequently observed in the eyes of children or young adults. Such patients usually are wearing no correction for the existing ametropia or they are only in part corrected. These people often are troubled to varying degrees by asthenopia, although sometimes they are symptom-free. Obtaining consistent, reliable refractive findings can prove to be difficult. Refracting such patients after the instillation of a cycloplegic usually results in a reliable gross finding. However, at the time of the post-cycloplegic refraction the examiner encounters the same variable, unreliable refractive conditions just described, especially in uniocular testing.

The following is a case report which will help to explain the author's technique for refracting such patients. The case is not presented because it is in itself unique but because the approach is usually helpful in handing other similar cases.

---

*Read before the annual meeting of the American Academy of Optometry, Section on Aniseikonia and Refractive Problems, Boston, Massachusetts, December 14, 1958. For publication in the May, 1959, issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.

†Optometrist. Member of faculty. Fellow, American Academy of Optometry.

The patient was a white, healthy, intelligent male stenotypist, age 24 years. His chief complaints were: tired eyes especially from late morning through the rest of the day and almost every day. Also, bifrontal, dull headaches, at least one per week, which lasted for most of the day were experienced. An unusual amount of close work and/or television viewing seemed to trigger the headache. The duration of his complaints was more than one year. The patient was wearing spectacles when seen which had been prescribed by another examiner two years earlier. These were O.U. +1.00 D. spheres. The visual acuity with or without correction was 20/20, either eye. Near vision was 14/14, each eye. The pupils, media, blood-vessels and discs were normal. The visual fields were normal as measured on a multiple pattern screener. The ocular motor tests yielded results well within normal limits.

During static retinoscopy the patient fixated binocularly a blue-green muscle light located twenty feet from him. The retinoscopic reflex for each eye was excellent. However, the movements of the shadows were quite variable. Within brief periods, while scopeing the eyes, the shadows were observed to change from with motion to against motion and back again despite the fact that fixation was good. This was a typical picture observed by the author in cases of over-action of the ciliary. At about +4.50 D. sphere for each eye (this was the net static value), glimpses of neutrality were observed. However, the best uniocular visual acuity was 20/200 with the +4.50 D. lens.

A routine subjective manifest refraction followed retinoscopy. A fogging lens of +6.00 D. sphere was used before the right eye. This degree of plus was selected because retinoscopy had shown signs of neutrality with the +4.50 D. sphere. Also, this was an attempt to relax accommodation. The left eye was occluded. The usual subjective refraction technique was tried. The induced blur in the right eye was slowly reduced until the patient was able to recognize the characters of the 20/40 line. Such a degree of vision was obtained only when the fogging lens was reduced to a +1.50 D. sphere. This, in spite of the fact that neutrality had been observed through a net of +4.50 D. sphere. Subjectively, there was no astigmatism. By further reducing the lens power from +1.50 D. the patient was able to read the letters of the 20/20 row with his right eye through a +1.00 D. sphere.

Such a subjective examination could not be accepted as being accurate. It was repeated with identical results. Over-activity of the ciliary mechanism was making accuracy in refraction an impossibility.

At this point a +6.00 D. sphere was again placed before the right eye. A +8.00 D. sphere was substituted for the occluder before the left

eye. This lens power was selected at random. Now both eyes were seeing, although each eye was fogged. The patient was directed to a different letter chart. The plus value before the right eye (the eye being tested), was slowly reduced until the patient was able to read the characters of the 20/40 line. He could now do so with a +4.75 D. sphere before the right eye. No astigmatism was elicited subjectively. The patient's attention was returned to the row with the 20/40 characters. At this time the +8.00 D. sphere, acting as a transparent cover before the left eye, was quickly replaced with a conventional occluder. At once, the patient was unable to recognize the 20/40 letters. He was only able to distinguish the 20/200 character. As soon as the +8.00 D. sphere was substituted for the blank occluder before the left eye, the right eye was again capable of reading the 20/40 line.

The plus value was slowly reduced before the right eye until the patient's acuity was at 20/15. He attained this vision through a +4.00 D. sphere. However, occluding the left eye dropped the visual acuity of the right eye down to about 20/200.

The routine subjective refraction of the left eye, the right eye being occluded, was variable and inaccurate due to overaction of the ciliary mechanism. When a +8.00 D. sphere was placed before the right eye, instead of the occluder, and a +6.00 D. sphere fogging glass was before the left eye, the accommodative activity of the two eyes became quiet and controlled. This procedure allowed for an accurate refraction of the left eye. The patient obtained 20/15 vision through the left eye with a +3.50 D. sphere. This lens caused vision to drop to about 20/200 when the right eye was covered.

The following lenses were prescribed: O.D. +3.50 D. sphere. O.S. +3.00 D. sphere. This represented a one-half diopter reduction in plus for each eye from what was determined by the above method. The new prescription represented an increase of +2.50 D. for the right eye and an increase of +2.00 D. for the left eye over the value of the old lenses.

Three weeks after receiving the new spectacles for constant wear, the progress report examination revealed that the patient was free of symptoms. The visual acuity was 20/15 each eye and both eyes. It is felt that this case could not have been refracted accurately or corrected properly by routine manifest techniques.

80 BOYLSTON STREET
BOSTON, MASSACHUSETTS

AMERICAN JOURNAL OF OPTOMETRY
and ARCHIVES *of*
AMERICAN ACADEMY OF OPTOMETRY
Established 1924

Vol. 36 May, 1959 No. 5

EDITORS AND STAFF

Dr. Carel C. Koch ..... *Editor*
Dr. Monroe J. Hirsch ..... *Associate Editor*
Dr. Rudolph Ehrenberg ..... *Advertising Manager*
Terry Judith Parkins ..... *Editorial Assistant*
Grace Weiner ..... *Bibliographic Editor*

Publication and Academy Office: 1508 Foshay Tower, 821 Marquette Ave.
Minneapolis 2, Minnesota

Annual Subscription, United States and Canada, $8.00 in Advance; Foreign, $9.00; Single Copies 80c

Original papers, scientific communications, clinical reports, books for review, and correspondence should be sent to the editor. Subscriptions and applications for single copies should be addressed to the circulation manager. Copy of advertisements must be sent in by the first of the month preceding their appearance. Communications with reference to advertising or other journal business should be addressed to the advertising manager. Academy correspondence should be addressed to Dr. Carel C. Koch, Secretary of the American Academy of Optometry.

Published Monthly by the
AMERICAN JOURNAL OF OPTOMETRY PUBLISHING ASSOCIATION

The American Academy of Optometry and the publishers of this journal have no objection to the reprinting by other magazines of any of the articles in this issue, provided such reprints are properly credited to the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.

IS THE FITTING OF CONTACT LENSES AN OPTOMETRIC SPECIALTY?

In the several health professions the practitioner chooses between general or specialty practice. It has been suggested that the fitting of contact lenses constitutes an optometric specialty, and it is our purpose here to consider whether this field is a true form of specialization.

There are a number of characteristics of a true specialty: (a) The specialist must possess knowledge and/or skill in his specialty above that of the general practitioner; (b) the specialist usually limits his practice to that specialty to the exclusion of other branches of his art; (c) the specialist usually possesses equipment not necessary for general practice; (d) the public's need for the service is limited and, hence, only enough men practice the specialty to satisfy this need.

By these criteria, the fitting of contact lenses was a true specialty twenty years ago. The demand for contact lenses was small. This work was performed by a few dedicated optometrists who studied and experi-

mented constantly to improve their skills and knowledge. Many of these men limited their practices to contact lens fitting. The procedure for fitting the then used scleral lenses required special apparatus for casting molds of the eye, a number of trial contact lenses, instruments for adjusting the lenses, and other special equipment. Most optometrists in general practice lacked the special knowledge about compatible solutions and the skills necessary to take molds and adjust scleral lenses.

Today, by these same standards, contact lens fitting is a part of the general practice of optometry. What has happened in this short time is an interesting phenomenon in the growth and development of a profession. When a new field is undergoing development, it is often practiced as a specialty. However, if it becomes well worked out, simpler, and of practical value to more than a few patients, it ceases to be a specialty and is incorporated into general practice. This has happened with contact lens fitting.

Today at least half of all optometrists are fitting contact lenses. In California a questionnaire was sent to 1,019 members of the California Optometric Association by the Contact Lens Committee of that body asking whether the member was "experienced in and was fitting contact lenses." With all returns still not in, 450 members have already answered affirmatively.*

What is responsible for this change within so short a time? Clearly, a great deal of credit goes to the early "specialists" who studied, experimented, and helped develop the field. The contact lens laboratories and manufacturers have contributed technological information and have made the lenses readily available, improved the quality, and have established standards of quality and orderliness of description of the lens desired by the practitioner.

A major portion of the credit, however, belongs to the optometric educational institutions. The schools and colleges of optometry, in addition to their research and development contributions, have added courses in contact lens fitting to their curricula. While the optometrist who studied twenty years ago had a very limited knowledge of contact lenses when he finished his formal education, today's graduate is well versed in this field. He has received excellent training in the theory and practice of contact lens fitting and upon graduation is well qualified to engage in this work.

That the schools and colleges are responsible for this change is attested by the recent set of figures on the percentage of optometrists who

*Personal communication from Herbert S. Player, Chairman, Contact Lens Committee, California Optometric Association.

engage in contact lens work in California. These are presented according to the number of years the optometrist has been in practice.*

Years in Practice	1 to 3	4 to 6	7 to 9	10 to 12	13 to 18	19 and Over
% Who Fit Contact Lenses	85.7	69.3	68.2	55.2	54.3	38.5

Thus, 85 per cent of the optometrists in their first few years of practice, i.e., recent graduates, practice contact lens fitting. On the other hand, less than 40 per cent of the men who completed their formal education twenty or more years ago practice within this field. Between these two extremes, the percentages vary in an orderly fashion.

Clearly, the fitting of contact lenses today is considered by most optometrists to be a part of general optometric practice. Certainly, this is true of the younger optometrists. Thanks to our schools and colleges, these new optometrists have all of the knowledge and skill necessary for fitting contact lenses.

Perhaps the most important result of such developments as those described here is their effect upon optometry in general. As new areas cease to be specialties and are incorporated into general optometric practice, optometry itself becomes a broader field. As a result of such additions, optometry itself has become a more nearly complete and unified professional service. During the past half century, the modern optometrist has evolved into that practitioner whose knowledge of physiological optics and ophthalmic optics is such as to enable him to diagnose and correct all optical defects.

Some optometrists in times past have, with some justification, felt that their profession was too limited. The measurement of refractive errors and the fitting of spectacles hardly seemed a complete profession, and there was much feeling of limited horizons. Today, the optometrist who fully practices his profession realizes that no such limitation exists. By applying to the fullest his knowledge of physiologic and ophthalmic optics, the optometrist practices a unified, useful health profession.

The accusation is sometimes made that optometrists desire to encroach on the field of medical eye care. Anyone who fully understands the present scope of optometry realizes that these claims are unfounded. One profession can only incorporate so much knowledge. The goal of optometry in the foreseeable future is the full practice of the

*Newsletter of the Economic Advisory Committee, Department of Professional Affairs, California Optometric Association.

profession. If this is done, there is neither time nor energy left to intrude upon other professions.

MONROE J. HIRSCH

SPECIAL REPORTS

OPTOMETRY AND INTERPROFESSIONAL RELATIONS*

Carel C. Koch†
Minneapolis, Minnesota

INTRODUCTION

The first portion of this report** on interprofessional relations, to a very large degree dealt with causes of friction between those working in the field of eye care which developed because of actions within ophthalmology or dispensing opticianry. Part one also dealt with suggestions to remove these sources of professional irritation.

The second part of this report on interprofessional relations deals with causes of friction between those in the eye care field that originate within optometry and with suggestions to eliminate these. Better relations throughout the eye care field is in the best interest of the public.

In the first report emphasis was made that the proposals were the author's ideas only. In this second part of the report this must again be stressed. The proposals which follow represent only his thinking on these subjects.

ON PATIENTS REFERRED TO SPECIALISTS

Probably no professional group in the healing arts field refers as many patients to medical practitioners as do optometrists. This practice continues day in and day out without much thought being given to the subject by the men involved. When optometrists suspect or find pathology they consult nearby medical men through the quick referral of the patient.

During recent years there has been some criticism of how these referrals are made. Some ophthalmologists have objected when patients were referred by optometrists to medical men who were not essentially

---

*Read before the annual meeting of the American Academy of Optometry, Section on Pathology, Boston, Massachusetts, December 14, 1958. For publication in the May, 1959, issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.

†Optometrist. Fellow, American Academy of Optometry.

**Carel C. Koch. Aspects of Interprofessional Relationships. Am. J. Optom. & Arch. Am. Acad. Optom. 35.2.83-99. 1958.

in the eye care field. These objections have helped upset normal interprofessional relations between optometry and ophthalmology.

In their objections, these ophthalmologists contend that when an optometrist finds or suspects pathology, the case should be referred only to an ophthalmologist. They say, it is then their duty to call in other specialists if these are required. They contend that the optometrist, being a member of the team dealing with eye care, should confine his referrals to medical eye men. They point out that the optometrist's undergraduate professional training is largely limited to the eye and its appendages and that optometrists often are not sufficiently skillful in choosing medical specialists to whom cases may be referred. They suggest that patients with known or suspected ocular pathology or general systemic problems can best be referred through the training and skill of an ophthalmologist.

While this jurisdictional squabble has all the aspects of a tempest in a tea pot, it has, nevertheless, also caused some friction and raised some pertinent questions.

It has been pointed out that optometrists are commonly known to refer patients direct to neurologists, psychiatrists, internists, surgeons, dermatologists, otologists, nose and throat men, as well as medical general practitioners and ophthalmologists. One question which arises from this practice is whether the training of optometrists and their examination and refractive procedures on the eye alone are adequate to make such specific referrals. Naturally the answer to this question depends upon the skill of the individual optometrist, the case history, the condition of the patient and the collaboration that exists between the optometrist and the specialist being considered for the referral. There is probably no way to concoct hard and fast rules to cover this situation. Nor is it essential to have rigid rules, as the patient has a rather important voice in this matter.

Another question which arises is, where the suspected pathology is not essentially ocular, would it not be better for the optometrist to refer the patient directly to his family medical general practitioner and let the G. P. call in anyone he chooses after he finishes his examination and makes his diagnosis? Here again the welfare of the patient and his wishes must be considered. Certainly optometrists should have strong working relationships with the medical general practitioner, just as they have these with ophthalmologists. In addition, while entirely outside the scope of optometric practice, the complicated medical professional concepts of intraprofessional referrals among physicians is involved. It is not necessary to go into this latter subject in this report.

As the issue has been raised by ophthalmologists and interprofessional relations between optometry and ophthalmology are affected, it might be well to consider where everything else is equal that these patients be referred to ophthalmologists. Certainly those with obvious ocular involvement should be sent directly to these men. In other cases, particularly those having an eye manifestation of general disease, both the patient and the optometrist would be best served by a referral to the patient's medical general practitioner. Other specialists should, if he chooses, be brought into the case by him. By following this easy and common sense suggestion the cause of friction would be eliminated to a large degree and interprofessional relationships would be improved.

OVEREMPHASIS ON LEGISLATION AND REGULATION

Interprofessional relations between optometry and ophthalmology are effected in no little degree by the regular appearance in State legislative halls throughout the country of groups of optometrists attempting to (1) preserve the existing order, or (2) perhaps affect some change in optometric practice standards. The proposed legislation is, in most cases, drafted to support some immediate optometric concept which at the moment seems in the best interest of optometry or the public. Most of these Bills are directed towards controlling the activities of optometrists and to be sure, only on very rare occasions over the years could these Bills have had any direct effect upon medicine or ophthalmology. Yet, to them, this seemingly endless flood of proposed legislation, coming as it does, legislative session after session, makes ophthalmologists nervous and suspicious as they frequently fail to understand the purposes behind these proposals.

This is unfortunate, as it strains interprofessional relationships. We as optometrists would be fearful and suspicious, too, if we were aware that, during legislative sessions, ophthalmologists were in constant attendance in State capitols attempting to pass laws in some way having to do with eye care. On the other hand as Wick* points out we must not overlook the fact that a powerful lobby is usually present for medicine.

The writer is aware of the importance to the healing arts professions of proper legislation. Occasionally such laws must be amended to bring them up to date or to satisfy conditions that have changed. However, the writer believes that often optometrists attempt, by means of laws, what should rightly be done by education and public relations activities.

*Ralph E. Wick. Communication of August 21, 1958.

Optometry, having reached maturity, should understand that laws have their limitations as well as advantages. Optometry today is suffering from an over-dose of self imposed restrictions and regulations. These restrictions are imposed upon optometrists by optometrists. Many of them seem immature to other professional people.

There are several things that can be done to correct this bad habit we have gotten into as a professional group. In the first place, we must recognize that legislation is not a cure-all. It has its place, to be sure, but we should carefully study and consider every legislative proposal. Before preparing a Bill we should make sure that it will not, in the long run, do more harm than good.

As professional men we should be entitled to exercise our professional judgment in matters of practice procedure and practice development. The fewer legal hand-cuffs we put on ourselves the better. Our young professional graduates receive excellent and detailed training. If they are not circumscribed by too many regulations they will rapidly develop into good practitioners and be the type of colleagues of whom we can be proud.

Next, we should consult with local ophthalmology, dispensing opticianry and with State Medical Associations when we feel we must move in a legislative direction. Good interprofessional relations demand this.

Third, we should understand that changes in optometry are inevitable. When these come, we should know that satisfied dominant groups frequently seek through artificial means, or by pressure tactics, to abuse and preserve the status quo and thus prevent change. This results in repressing the forces working for change and these finally explode into open conflict. This, too, hurts interprofessional relations.

In addition, we should understand that changes are gradual as well as inevitable and that while this is true, they are sometimes slow. We must not regulate optometry to the place where its practice standards are ahead of those the public expects or will support.

Many of the problems in this area are not legislative but are educational. While today most optometrists do, all must be brought to understand what is expected of them as professional men. The public must be taught, not only that an optometrist's office is a good place to seek visual service, but also, that an optometrist is a trained specialist in his chosen field. These are jobs for educational and public relations experts.

What is overlooked by those who are intolerant of other persons' viewpoints, or those who wish to regulate every phase of optometric life is, that they fail to see in these laws, State Board regulations and

self imposed organizational restrictions the policeman who lurks behind all these schemes as they attempt to regulate the profession into goodness.

These policemen, in the form of officials of the attorney generals' office, the district court, State board officials, association officers and all the rest, do have their place. But their work must be done in moderation and with consideration for the well being of all. In the hands of zealots, these actions may rapidly lose us our liberties, our freedom of thought, and all hope of progress.

COMMERCIAL PRACTICES

Because of his unethical practice habits, the commercial optometrist at times upsets interprofessional relationships between optometry and ophthalmology. This does not happen, however, as often as is suspected by the great majority of optometrists who practice ethically. In fact, the majority of optometrists who do practice ethically are far more disturbed by the lack of professionalism on the part of the commercial optometrist than are ophthalmologists who generally feel that as long as there is a demand on the part of the public for that sort of thing, it will be supplied by someone and, naturally, not a physician. Optometrists know this last assumption is not necessarily true as in some urban centers physicians are employed as refractionists in the most commercial environments.

Ophthalmologists are at times puzzled because of the reliance optometrists place on legislation to up-grade optometric practice concepts and the amount of this legislation that has been passed in relation to the seemingly minor effect it has had on those optometrists who still practice in a commercial manner. Optometrists, too, at times express the same viewpoint. Both forget, though, that the commercial practitioner as a rule keeps just within the law. Actually this legislation has everywhere had a marked effect and has done a world of good. Yet, here, the limitations of legislation are made somewhat apparent.

Acts regulating the practice of optometry delegate enforcement of the law to members of the State Examining Board. In cases of a suspected violation, this Board receives the evidence, files the charges and then sits as judge during the hearing. It is a typical illustration of the workings of administrative law. This is a form of judicial procedure disliked by both the Bar and the Bench. However, the Act which sets up this machinery also provides that the accused may appeal the decision of the Board to the District Court or similar jurisdiction if he is not satisfied that justice has been done. This is the safeguard placed in the Act against capricious or tyrannical acts of the Board and it is a perfect and necessary safeguard in maintaining our liberties.

Optometrists who serve on our State Boards of Examiners soon learn that unless the violation seriously endangers public welfare, or is one in which accused optometrist has repeated the offense, time and time again, after a warning, or perhaps a short suspension of his license, that they are on thin ice in making an example of the offender. In fact, unless these serious conditions are met the District Court is likely to find for the accused.

A second point that mitigates against hasty or wide-spread Board action against violators is that charges against the accused must be presented and substantiated at Board hearings. Even the most seriously offended patients are usually reluctant to take such steps.

In spite of these restrictions our State Boards have generally assisted in raising practice standards within the limitations of their laws. On many occasions the Courts have upheld conservative Board action and will no doubt continue to do so. Nevertheless, these actions must be kept to a minimum. Here again the major persuasive force must be the weight of professional opinion, which in the long run is a most powerful deterrent. In considering this entire matter from the standpoint of interprofessional relations we must point out that professional opinion is the force used by medicine to a great degree—and with good effect. Optometry is fast learning this trick. In medicine, the loss of a license to practice is usually limited to cases in which illegal abortions are done in wholesale lots, or in those Federal cases in which narcotics are sold without proper reason.

ON THE USE OR NON-USE OF CYCLOPLEGICS

Another aspect of interprofessional relations between optometry and ophthalmology revolves around discussions which take place over the use of cycloplegics in refraction. In the past* the writer has taken an active part in these, emphasizing the value of the non-cycloplegic techniques and pointing up some of the pitfalls encountered in cycloplegic refraction. There are, however, pitfalls both ways. Optometrists are taught the techniques of non-cycloplegic refraction in their undergraduate professional courses. Generally, ophthalmologists are taught the techniques of a cycloplegic refraction in the clinics or hospitals where they usually get their graduate training in refraction. Naturally each group believes that his instruction is best. This is natural. One feels at home in using a familiar technique and finds the unusual or different procedure very difficult to use and to a large degree unsatisfactory.

*Koch, Carel C. An investigation as to the need for "drops" or cycloplegics in eye examinations. Am. J. Optom. 15, (1) 17-39, 1938.

To illustrate this, may I point out that for a number of years, prior to his death in 1938, the writer had as an associate, Dr. Jack I. Kurtz, an optometrist who became well known in the profession for his studies on (1) accommodation and (2) the effects of various techniques in the field of orthoptics. Kurtz was a graduate of the first class in Applied Optics at the Ohio State University under Dr. Charles Sheard. Shortly after leaving school in 1916 he became an associate of a Minneapolis ophthalmologist and for several years did refractions in his office and also with him in the Army during the first World War. In most of these refractions a cycloplegic was used. When later Dr. Kurtz moved into the writer's office he was so conditioned to cycloplegic refractions that he found himself almost unable to refract by the non-cycloplegic techniques and for years occasionally resorted to the use of "drops" to assure himself of his findings.

The reverse is also true. This is natural as one unconsciously feels that better work is being done while employing a well known and fully understood technique. For instance, an optometrist, familiar with non-cycloplegic retinoscopy, feels somewhat lost at the unusual (to him) retinoscopic reflexes encountered when refracting with a cycloplegic. This is only one of the differences found in the two techniques, but is alone sufficient to make him question the findings. The ophthalmologist on the other hand is familiar with the technique and gets his findings usually without difficulty.

Bannon,** as a result of his clinical research work at the Dartmouth Eye Institute, has pointed out that both techniques, when used on the same patients, in the hands of skilled refractionists, yield comparable results. Apparently it is largely a matter of training and practice. As this is the case, it should remove the entire question of cycloplegic or non-cycloplegic refraction from those larger areas in which possible disagreement might arise to effect interprofessional relations.

While it is true that the end results of both techniques are similar and satisfactory to virtually all patients, the different clinical aspects of the matter have had unfortunate explosive consequences in the past that have been detrimental to interprofessional relations and perhaps will be so again.

Optometrists resent the implication occasionally used in certain ophthalmological circles that they are prohibited to use a cycloplegic. As the writer said in Part I of this report, optometrists are trained and prefer to refract without the drug. If the attempt is now made by

**Bannon, Robert E. The use of cycloplegics in refraction. Am. J. Optom. & Arch. Am. Acad. Optom. 24, (11), 513-568, 1947.

recalcitrant ophthalmologists and dispensing opticians to down-grade the public's concept of the ability of optometrists to examine and refract, because of the cycloplegic question, optometry may be forced to remove those restrictions if only to eliminate this sort of propaganda.

CRANKS AND CULTISTS

The profession has been singularly free of cranks and cultists and it is hoped that the few who are in practice can be brought around by proper educational persuasion to understanding the harm they are doing to their patients, to themselves and to the profession. In a considerable degree those who fall into these categories are in practice in the urban centers. This is probably true as the expected failure of these clinical procedures are less apt to become public knowledge in the larger cities. Nevertheless, word of what they are doing does get around and their activities are frequently the cause of harmful interprofessional relations between ophthalmology and optometry at local levels.

Among the small group of optometrists who cause these problems in interprofessional relations are those who recommend visual training for any or all patients. Also those who dabble in diets, vitamins, light therapy, Bates techniques of better sight without spectacles, minor infractions of medical practice and those who make a fetish of attempting to cure myopia. Just why myopia should be selected to be "cured" has always been a mystery to the writer. Why not hypermetropia? Of the two, hypermetropia is more prone to cause unpleasant symptoms and what is loosely described as visual fatigue. Hypermetropia in general seems to present far more problems to the patient than does myopia. Of course we know just as little about curing one as we do the other.

It is difficult to get one's thinking in tune with these few practitioners who practice these techniques as they are prone to ignore the scientific fundamentals upon which the clinical practice and science of optometry rests.

Here the writer is not being unsympathetic with those attempting to halt the progress of progressive myopia in school children by means of bifocal therapy, contact lenses, prisms or visual training. Such attempts at control measures, while not too effective, are not to be confused with the claims for myopia cures of some. In fact, in time, these carefully controlled clinical experiences may produce some measures of real value.

The problem of the cultist may be corrected in part, at least, through a series of friendly conferences with these individuals during which the true scope of optometric practice is reviewed. This should

be coupled with a sincere request on the part of the conferees that these non-optometric or doubtful practices be discarded.

This will not always work, but friendly pressure by colleagues can usually get cooperation from the practitioner in question. It is certainly worth trying in areas where this condition exists, as the elimination of these practices will improve interprofessional relations.

ON THE USE OF TECHNICIANS

One of the factors that has upset interprofessional relations between optometry and ophthalmology has been the attitude of some optometrists towards the use of technicians in ophthalmological offices. In recent years these spokesmen have become quite vocal in demanding that all technicians working for ophthalmologists perform their duties under the constant and immediate supervision of the ophthalmologist himself.

Here we apparently find the fear that these technicians will perform as independent practitioners. In fact, this fear is not entirely without some foundation. Unlicensed technicians now fit contact lenses without supervision and a few ophthalmologically certified orthoptists have opened independent offices and are apparently serving the public. In addition it is known that under office supervision the installation of a cycloplegic, field studies, some refractive techniques and orthoptic treatments are done by technicians in certain ophthalmologists' offices. We must remember though, that some of the same things are done by technicians in many optometric offices under about the same amount of supervision.

This entire question dealing with the use of technicians is found to be full of irrational emotions, seemingly based upon misconceptions and faulty thinking. Actually, as both optometrists and ophthalmologists use technicians in their offices for all sorts of ancillary services, one cannot help but wonder why the question was raised and just who is guilty of what?

The record is clear that for the past 500 years medicine has leaned heavily upon technicians. Five centuries ago the physician made the diagnosis, but would only touch a patient at rare intervals. The diagnosis of that day—such as it might be—was only made by observation and deduction. No actual physical examination was made. The technicians of that day did the physical work. The surgeon, who was then a technician, handled the patient under supervision of the physician. Another technician, the midwife, delivered the mother. Without an interruption, technicians under one name or another have served medical men. Today innumerable diagnostic and clinical tests are run for physicians by technicians, nurses and others. It therefore should come as no

surprise that today's ophthalmologists use such assistants. It is illogical to expect them to stop this practice. The use of technicians is well rooted in all of the medical specialties.

In a broad sense it is not necessary for us to concern ourselves with the actions of ophthalmology in this respect. Fitch* does point out, however, that a few states have legislation dealing with the activities of technicians and such laws must be taken into consideration. If an ophthalmologist wishes to delegate the orthoptic work in his office to a technician, in the end only he will suffer if this work is poorly done, as his patients will go elsewhere. This point is well covered by Neumueller** who says, "During my many years of contact with ophthalmologists, I have found them to have a wholesome respect for refraction. This service usually constitutes the major portion of the ophthalmologist's practice, and the patient expects to get the personal attention of the ophthalmologist and not that of a technician. Whenever this principle is consistently violated, the existing keen competition will tend to correct it."

As optometrists we should remember that ophthalmologists resent being told what to do by optometrists, just as we resent it when some ophthalmologist tries to tell us how to practice. These actions impair interprofessional relations.

The whole question regarding the use of technicians actually has no place in our discussions with ophthalmology so long as these assistants serve under supervision. As both groups of practitioners use technicians it seems to the writer that we had best spend our energies in making sure that our own technicians are properly trained and that they perform the services expected of them to the very best of their ability.

DISPENSING FOR OTHERS

Prior to the first World War, it was usual for an optometrist to refer to himself as an optometrist-optician. With the tightening of practice standards within optometry, and with the raising of ethical concepts for the profession that came about 40 years ago, it was decided to drop the word "optician" and to eliminate the hyphenated title. Optometrists agreed to refer to themselves only as "optometrists" and within a decade so much progress was made that the word "optician" was no longer used to any substantial degree by optometrists in referring to themselves.

*Lawrence Fitch. Comunication of August 18, 1958.

**Julius F. Neumueller. Optometric control of medical practice through legislation: An optometrist's reply. International Record of Medicine. 171. 3. 178. 1958.

In the early part of this century, this idea grew from the desire on the part of optometrists to emphasize the words "optometrist" and "optometry." Just a few years before this, the American Optical Association had changed its name to the American Optometric Association, and the move to drop the hyphenated title seemed to be a logical step in this direction.

Practitioners of that day realized that while they prescribed and dispensed ophthalmic materials, that less and less laboratory work was taking place in their offices. Consequently, it did not seem illogical to drop the title "optician." In addition, the laws regulating our practice referred to our profession as Optometry and to the individual practitioner as an Optometrist.

Shortly thereafter, the suggestion was made that as optometrists were no longer using the title "optician" that as a professional group they should discontinue filling prescriptions not written by themselves. This meant the discontinuance of filling prescriptions written by ophthalmologists and other optometrists and the loss of income this entailed. While this practice never became universal among optometrists, in recent years it has become very widespread. The American Academy of Optometry was instrumental in seeking acceptance for this plan and the American Optometric Association supported the idea by suggesting that no member hold himself out as a dispensing optician to the public. It should be emphasized that this development was not done to discredit ophthalmologists, but rather to raise practice standards and the public's concepts of work done by optometrists. In addition, the more suitable up-stairs optometric professional offices of that day made optometrists less available for drop-in dispensing business.

However, refusal of optometrists to fill prescriptions written by ophthalmologists and others did have several effects which were not anticipated at the time these ideas took root. The first of these was that ophthalmologists were offended. Refusal to fill their prescriptions was misunderstood by some of their patients as a reflection upon their ability to write presciptions. This was one of the contributing factors in starting problems in interprofessional relations between the two groups.

The second effect was that ophthalmologists were forced to send their patients to selected dispensing opticians, or to optometrists who practice commercially, and not just turn the patient loose with a prescription. In time this method of patient referral led to very close collaboration between ophthalmology and dispensing opticianry. It also materially strengthened the position of the dispensing optician and

increased the number of them. This collaboration also led to the kick-back problems of 1948 and the embarrassment of many ophthalmologists which followed.

The next trend was for a substantial number of ophthalmologists in their offices to gradually adopt the practice of dispensing the spectacles they prescribed, just as do most optometrists. For a time, this was a violation of the practice standards of the American Medical Association, but these standards were recently changed to permit ophthalmologists to dispense ophthalmic materials.

While many ophthalmologists turned to dispensing their own materials, many others did not. The problem still remains as to the proper manner of servicing this latter group of patients, some of whom occasionally call upon optometrists for this service. A large number of optometrists are now located in first floor clinic offices and as the result of this change in location, are now available to those seeking dispensing service.

In considering this matter, it seems to the writer that the reason for this self-imposed prohibition has to a very great extent been removed. This is not a popular suggestion among optometrists, as many disagree. However, the writer feels that the public is now familiar with the term "optometrist" and largely associates it with eye examinations, refractions, ophthalmic materials, dispensing and spectacles. To a very remarkable degree the term has become a household word throughout North America. As this is now the case, and the prohibition is causing ill will which we certainly do not seek, it seems advisable to the writer to consider modifying the old concepts and bringing them in line with present day conditions.

Certainly I am not suggesting a return to the hyphenated optometrist-optician era. Nor am I suggesting that optometrists hold themselves out as being dispensing opticians and seek this business. However, I do suggest that under those conditions where hardship or embarrassment might ensue to either the patient or the ophthalmologist that the optometrist without comment provide the dispensing service that has been requested. Hard and fast rules are not practical and common sense must be used. Each case should be decided on its individual merit. If an optometrist decides to refuse to fill a prescription, certainly a full explanation is in order. The patient has a right to know the reason for this refusal and this explanation should include, if possible, a few appropriate words of praise for the writer of the prescription. Following this suggested routine will improve local interprofessional relations.

In reviewing the preceding suggestion dealing with an optome-

trist's refusal to fill a prescription which did not originate in his office, it might be well also for him to explain to the patient seeking this service just where this dispensing may be obtained. If it is just around the corner, or just down the street, all well and good. Give the patient the address and show him the way.

In addition, every optometrist should know one or more nearby dispensing opticians. If none are in his area and he is occasionally asked to perform this dispensing service, it is, in the writer's judgment, inexcusable for him to refuse. The inconvenience and distress caused the patient by this action is a far greater breach of ethics than would be the filling of the prescription itself. Ethics is just another word for proper service, and certainly in an optometric office where materials are dispensed every day, such refusal cannot be justified.

To carry this idea a little farther, it might also be suggested to optometrists that they not only know the location of nearby dispensing opticians, but also they should get to know these individuals and establish friendly relations with them.

To return to the main theme, it should be pointed out that ophthalmologists resent the attitude that some optometrists show towards dispensing and dispensing opticians. We must remember that a substantial number of ophthalmologists do not wish to dispense materials in their own offices. It follows then, that if optometrists do not wish to do this dispensing for them, then ophthalmologists rather properly insist that we let the dispensing optician do it without undue interference. This exchange of courtesy will make for better feeling all around.

HASTILY PREPARED RESOLUTIONS

One of the inexcusable, yet occasional, causes of friction among those in the eye care field has been the careless and thoughtless adoption of resolutions effecting major policy by various professional groups. It is unfortunately true that many approved resolutions falling in this category are hastily prepared, frequently during periods of anger or great stress. There is little thought given to the possible far reaching consequences of these actions, consequences which in most cases were not anticipated when the resolution was proposed, written and adopted.

Two well known examples of this sort of hasty action now plague both optometry and ophthalmology. The extremely harmful Resolution 4 adopted by the American Optometric Association at its Seattle meeting in 1954 resulted in one of the truly tragic experiences within recent optometric history. This resolution (quickly rescinded at the next meeting of the American Optometric Association a year later)

brought into being some equally tragic resolutions approved in anger by the Section on Ophthalmology of the American Medical Association at Atlantic City in 1955.

These resolutions followed hard on the heels of the still controversal Social Security legislation known as HR 6000 which was approved in 1950 by the Congress of the United States and by the 1953 demands of optometrists that dispensing opticianry be ousted from the National Interprofessional Committee on Eye Care.

This was all unnecessary and resulted in a widespread feeling of ill will between certain optometrists and ophthalmologists that has already done harm to the professions involved and the patients they serve. It all but wrecked normal organizational interprofessional intercourse.

Many of the cooler heads in both groups regret these unfortunate occurences, and ardently wish that these groups had not approved these harmful resolutions. They, like the writer, hope that in the future a cooling off period will be created so that important policy making resolutions arising in either camp have a year's wait between introduction and the final vote. This would enable each profession to quietly study and judge all possible effects of the passage of the proposed resolution before its possible adoption. Such action is essential and would improve the possibilities for better interprofessional relations in the future.

CONCLUSION

This report which was presented in two parts deals with many of the causes of friction between optometry, ophthalmology and dispensing opticianry. The author presents his own suggestions to eliminate some of these irritants.

In presenting this material, the author assumes that his readers join him in his desire to improve the relationships which do and must exist between all those working in the eye care field. These relationships are essential to the well being of millions of our citizens who look to us all for complete well rounded service tailored to their individual needs.

The fact that there exists in most English speaking countries, as well as in many other of the free democracies, independent groups cooperatively serving the public in various ways in the eye care field is one of the strengths of our system of free enterprise. It is a splendid example of vigorous competition improving the service which the public receives. In contrast to this, the recent reports dealing with health care in Soviet Russia, now published widely in the British ophthalmic literature, indicate that where such competition is absent that visual care is

poor by our standards. These reports show among other things that in the Soviet Republics today, tests for astigmatism, for instance, are made only in exceptional cases and that most patients must be satisfied with spherical corrections regardless of their actual need. It is the cooperative, yet competitive, system of eye care in the free democracies that has pushed the level of patient care and service to its present high standard.

Competition alone will do much of this; yet cooperation and competition will do more and do it better. It is for this reason that good interprofessional relations are essential. Factors that tend to interfere with this cooperation should be eliminated so that optometry, ophthalmology and dispensing opticianry may work together in complete harmony.

In closing, one other most important aspect of interprofessional relations must be stressed. In conferences dealing with these matters the attitude of those seeking solutions to problems should be one of understanding and desire to come to agreements that are mutually beneficial to all participants and to the public we all serve. Some of our present difficulties are traceable to the unfortunate concept of some in high positions in optometry and ophthalmology that interprofessional relations work means only "getting" and never "giving." That the conferences set up to guide the way to better relations are, instead, bargaining areas where sly power politics and the desire to get the upper hand by fair or foul means is not only the proper but the clever thing to do. This attitude must change before interprofessional relations between optometry, ophthalmology and dispensing opticianry will improve. The basis for better relations rests firmly upon trust and confidence. These attributes may only be realized through honorable and truthful dealings between all those serving the public in the eye care field.

ANNOUNCEMENT

SPECIAL REVIEW COURSE—LOS ANGELES COLLEGE

The Los Angeles College of Optometry is offering their annual Special Review Course, preparatory to State Board Examinations, June 8 to July 17, 1959. The course begins at 8:00 A. M., Monday, June 8, continuing for five days per week for six weeks. This course is open to graduates of all accredited schools and colleges of optometry. The total fee is $83.00. For further information, write to the Registrar of the Los Angeles College of Optometry, 950 West Jefferson Boulevard, Los Angeles 7.

A REVIEW OF OPTOMETRY IN COLOMBIA*

Hernando Henao, R., Jr.†
Bogota, Colombia

The original Colombian statutory provision for the registration of optometry was enacted on March 1, 1933. Prior to that date the profession consisted of only a few men, some with recognized academic training from Germany and the United States, and others without academic preparation.

To the best of our knowledge the first optometrist in this country was Dr. Fernando Estrada, in the city of Medellin. He is still living, and until a very few months ago was still in practice. He also has many sons in the ophthalmic field, including opticians, optometrists, and one ophthalmologist. Dr. Estrada received his optometric education in Germany. His practice in Colombia dates back to 1917.

It is known that in 1922 at least two presently living persons were providing a form of optometric service in Bogota, the capital city. One is Mr. Ernest Schmidt, owner of the largest optical firm in the country, who has contributed much to the favorable development of optometry. Two of his sons are optometrists, graduates of the Pennsylvania State College of Optometry. The other early Bogotan was Mr. George Strassmann, who used to have a general store in which optometric services were included. He retired from the field 20-25 years ago.

In 1923 my father, Dr. Hernando Henao M., having completed his optometric studies at the Rochester School of Optometry, established the first Colombian optometric practice meeting modern professional standards. His contributions to professional advancement included a number of publications on optometry in newspapers and medical journals and an important role in the legislation for the registration of optometry in 1933.

Contemporary with my father and also a graduate of the Rochester, New York, school was Dr. Julio Angel, now practicing in Manizales. About three other persons are remembered as offering optometric-type services in Bogota in this early period, but they were not Academically qualified and have not generally been considered important to the development of the profession.

In 1950 the academically trained optometrists of Colombia formed

*Submitted on March 28, 1959, for publication in the May, 1959, issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.
†Optometrist, Fellow, American Academy of Optometry.

the Federacion Colombiana do Optometras Graduados. Members of this association are listed in the 1958 BLUE BOOK OF OPTOMETRISTS. In 1954 the optometry law was amended to improve the standards of licensure and practice. Very recently (1957) a number of leading Colombian optometrists and ophthalmologists organized and incorporated the already widely known international society, *Sociedad Americana do Oftalmologia y Optometria*, and started publication of the society archives in English and Spanish.

The total number of practicing optometrists in Colombia is approximately 120. This includes a substantial number of essentially self-trained persons who took and passed examinations for licensure at the time the optometry registration law was enacted. Most optometrists maintain their own laboratory facilities. The establishments are typically organized as an optical service with refracting rooms annexed. The appearances of the establishments are typically in good taste and are generally regarded to be professionally acceptable. Neon-type signs are quite common, but are generally considered ethical. Quite a few physicians, dentists, bacteriologists, and other related professions also use them.

The interprofessional relationship between ophthalmologists and optometrists has been good, although, on at least one occasion, the ophthalmologists and optometrists have been at odds with each other on legislative matters. Optometric relationship with the general medical practitioner has been quite good, and inter-referrals are common. Optometrists are included in the Professional Club, a social club exclusively for professional people. An "optometrist" classification is provided for in the Bogota district of Rotary Internationale as a category under "physical therapy," a classification identifying optometry with the health and healing groups.

Contact lens work is considered a part of the optometric field, and three optometrists in Bogota provide this as regular service. Ophthalmologists also do some contact lens work in various parts of the country. Orthoptics and subnormal vision services are also provided both by optometrists and ophthalmologists. Optometrists participate to a limited extend in school vision programs.

In the determination and certification of the visual acuity of driver license applicants only the general physician participates—the certifying statements of optometrists or ophthalmologists are, as a general rule at the present time, not accepted by the Transit Office. However, in the matter of establishing minimum visual requirements for driving the Transit Office recently consulted the *Sociedad Americana de Oftalo-*

mologia y Optometria for recommendations. A set of recommendations was submitted to the Transit Office over the signatures of both optometrists and ophthalmologists.

In various parts of the country there are a few licensed itinerant optometrists who travel from town to town fitting spectacles. None of these has had formal academic training, and this type practice has become much less common. In the last several years the Colombian Optometric Federation has tried to abolish this mode of practice.

I believe there are not enough optometrists in Colombia to serve the optometric needs of the country. There are cities of over 50,000 without optometrists or even optical stores where spectacles might be obtained. It is this situation that delays the abolishment of the itinerant practices.

The ophthalmic industry is represented here by most of the major optical firms: Zeiss, American Optical, Bausch & Lomb, and others. The government has stopped the importation of spectacle frames, hence all of our frames are manufactured here. However there are no lens factories here, and so our lenses are imported almost entirely from the United States and Europe.

Since there is no optometry school in South America, consideration has been given to the establishment of a school in Bogota. Preliminary discussions have been held with the University of the Andes. It seems possible that a pre-optometry curriculum soon will be established here to qualify students for admission to American optometry schools, and that this could develop gradually into a full scale optometry curriculum.

CALLE 58, NO. 13-08
BOGOTA, COLOMBIA

CURRENT COMMENTS

Terry Judith Parkins
Editorial Assistant

Optometrists will confer a favor by sending news items of general interest for this department; such as relate to new instruments, clinical techniques, education, visual health and optometric legislation and organization.

FIRST WORLD CONTACT LENS CONGRESS

The first World Contact Lens Congress, sponsored by the Eye Research Foundation of Chicago, will be held at Edgewater Beach Hotel, Chicago, August 2, 3 and 4, 1959. Dr. Leonard Bronstein, Chicago, editor of CONTACTO, the official Foundation publication, says the Congress will attract 2,000 contact lens practitioners, at least a third of whom will come from overseas.

Special research reports submitted from all parts of the world are now being reviewed by the Eye Research Foundation for presentation at the Congress. These papers reveal an abundance of high quality and timely subjects, inventions, new theories and practical and pure research. Among those countries already to be represented on the speakers roster are the United States, Japan, Czechoslovakia, Colombia, Spain, England, France, Hungary, Germany, Argentina, Korea and Canada. Language barriers, once a problem in the organization of international events, will be overcome by the use of an IBM translation system, similar to the one used by the United Nations. During rest and entertainment periods, non-English speaking visitors will be assigned translators. During all meetings, a complete closed circuit installation will allow close range observation of technical demonstrations, without interference usually created by large audiences.

To contrast the hours of reports and meetings there will be a complete entertainment program and a special ladies' program throughout the three-day meeting.

A flag ceremony on Sunday, August 2, will mark official opening of the Congress, with presence of civic officials, a dedication reading, and salute to the flags of the United States, United Nations, Eye Research Foundation and City of Chicago.

On Sunday night, first evening of the Congress, a cocktail and dinner party in Old Western style will show visitors from other countries the American side of fun, food and music. A special presentation will be made of an American institution . . . the hot dog . . . and for some it will be the first ever eaten.

During the second Congress night, a banquet with after-dinner dancing will feature an all-nations atmosphere. Civic officials and

celebrities will share the dais during an entertainment packed program. One of several high points on the banquet program is the introduction and official crowning of the two winners of the "Miss International Contact Lenses" contest.

INDIANA CHAPTER-AMERICAN ACADEMY OF OPTOMETRY

One hundred optometrists gathered on March 15 in the Student Union Building of the Indiana University Medical Center in Indianapolis for the Annual Spring Seminar of the Indiana Chapter of the American Academy of Optometry. The program featured four speakers who described the most recent developments in four phases of optometric care.

Much interest was evoked by the report of Dr. John Carter, research assistant at I.U., describing his studies of tonometers and tonometric techniques for optometrists. This was an up to the minute extension of the report which he presented to the Academy in Boston last December.*

Dr. William Baldwin, lecturer in optometry at I.U., described and evaluated the developments in corneal contact lenses which have taken place in the last seven years. Drawing on experiences from his own practice, he also summarized the present problems of design, manufacture, inspection, modification, and fitting of corneal lenses for routine and special uses.

The recent developments in optical aids for subnormal vision were succinctly described by Dr. V. J. Ellerbrock, professor at Ohio State University, but his principal emphasis was on the often unrecognized need for greater attention to the psychological problems of the subnormal vision patient. Reviewing the optical principles of various special aids, he pointed out that a majority of subnormal vision patients can be helped more by common-sense application of standard optometric principles of prescribing than by prescription of cumbersome telescopic and microscopic devices which often aggravate the psychological problems already existing.

Dr. Frederick Hebbard, associate professor at Ohio State University, concluded the program with a report on the merits and faults of visual field screening devices, and a demonstration of the latest models of two such instruments.

POST-GRADUATE COURSES AT ILLINOIS COLLEGE OF OPTOMETRY

The second annual series of post-graduate courses will be held at the Clinic Building, Illinois College of Optometry, 3241 South Mich-

*To be published in the September, October and November, 1959, issues of this publication.

igan Avenue, Chicago 16, Illinois, May 30 through June 4, 1959. The three following courses will be given:

OCULAR PATHOLOGY

Lecturers: Russell H. Levy, B.S., M.S., Ph.D.
Jack Orbach, B.A., M.A., Ph.D.
Paul F. Shulman, B.S., O.D., D.O.S.
Roy Teshima, O.D., D.O.S.

Course A-1—May 30-June 1, 1959—Tuition: $75.00.

The course lectures will present a concise, fundamental, and practical review of such important topics as the ocular manifestations of general diseases, diseases of the external and internal eye, scleral tonometry, and examination and interpretation of the visual fields. Kodachrome slides and slit lamp demonstrations will supplement the ocular pathology lectures. Clinical instruction will include the examination of selected patients in the ocular pathology clinic.

CONTACT LENSES

Lecturers: David Huang, O.D.
Ronald A. Peterson, O.D.
Alfred A. Rosenbloom, M.A., O.D., D.O.S.
Roy Teshima, O.D., D.O.S.

Special lectures by:
H. S. Wodis, O.D., D.O.S.
E. R. Tennant, O.D., D.O.S.

Course B-1—Basic Contact Lens Fitting Techniques—May 30-June 1, 1959—Tuition: $75.00.

Three days of classroom lecture, demonstration, and laboratory instruction will cover basic theory, practical and clinical aspects of contact lens design, modern lenses of all manufacturers and fitting techniques. Contact lens fittings as well as necessary lens adjustments will be demonstrated. Members of the class will have an opportunity to practice these techniques. Discussion of patient control, progress analyses, office management, insurance practices, and approaches to public relations will assure a thoroughly practical orientation to this subject.

Course B-2—Advanced Contact Lens Theory, Techniques, and Practice—June 2-4, 1959—Tuition: $75.00.

This course is designed for the optometrist who has a basic understanding of and some experience in contact lens practice. It is especially designed for those who wish to broaden their knowledge by learning fitting techniques for difficult and special contact lens cases. Three days of classroom instruction, clinical demonstration, and laboratory practice will consider advanced contact lens techniques in aphakia, astigmatism, keratoconus, subnormal vision, and cosmetic contact lens correction. Laboratory instruction will emphasize established techniques for modifying the physical design and fit of contact lens.

The Ocular Pathology course is limited to 50 practitioners while registration for each Contact Lens course will be limited to 30 men. Enrollment for each course will be filled in the order that registrations are received. Notebooks and supplemental course materials will be furnished by the College. Each optometrist is requested to bring his own ophthalmoscope with battery handle for the Ocular Pathology Clinic. Certificates of completion will be issued by the Illinois College of Optometry.

TEN YEARS OF PROGRESS WITH EXCEPTIONAL CHILDREN

We have received for review a new monograph entitled, *Education Special—Tenth Anniversary Issue, Ten Years of Progress with Exceptional Children 1947-1957*, published by the Hunter College Chapter of the Council for Exceptional Children.

This 88 page monograph deals with a current review of achievements in the field of aiding exceptional children. As optometrists play an important part in one phase of this work it is felt that many of them would appreciate the opportunity of reading the more than 20 reports included in this special edition. Among the papers of particular interest to optometrists are:

"Exceptional Years for Exceptional Children" by Dr. Romaine P. Mackie; "New Approaches in Special Education of the Gifted" by Dr. David G. Salten; "Rehabilitation: An Overview" by Dr. Howard A. Rusk; "A Decade of Progress in Rehabilitation" by Dr. Sol L. Warren; "Rehabilitation of the Disabled Child: Some Psychological Implications" by Selma J. Glick; "The Brain-Injured Child" by Elizabeth S. Freidus; "The Partially Seeing Child" by Helen Gibbons and "The Mentally Retarded Child" by Melvin I. Semmel.

A copy of this board covered monograph may be secured from The Hunter College Chapter of the Council for Exceptional Children, 695 Park Avenue, New York 21, New York. Price $1.00 postage prepaid.

CONTACT LENS POST-GRADUATE COURSES AT INDIANA UNIVERSITY

A series of post-graduate courses in contact lens fitting will be offered throughout the summer of this year and plans are being made to accommodate 100 optometrists in 10 weeks. Each course will last five days, will be limited to 10 optometrists and will terminate with the presentation of a certificate of attendance from the Indiana University.

Experience gained in teaching post-graduate contact lens courses the last three years has resulted in a comprehensive and practical course of instruction complete with laboratory exercises and with clinical patients available as part of the Division of Optometry's Summer Clinic. The rapid growth of the fitting of contact lenses in the United States has produced a determination on the part of the faculty of the Division of Optometry to make this type of post-graduate training available on an unprecedented scale.

Drs. Charles Shick and William Baldwin will direct the training program throughout the summer. Both men are on the faculty of the Division of Optometry and both are taking graduate work toward the Ph.D. degree in Physiological Optics.

The contact lens courses already given by the Division of Optometry, have enrolled optometrists from all parts of the United States and from South America and Australia. The tuition is $60 plus a $15 laboratory fee to cover the cost of materials and lenses used. A new course will start at 8:30 a. m. every Monday from the 8th of June, 1959, through the 28th of August. No classes will be held during the week of the American Optometric Association convention in Dallas, June 28-July 1, 1959.

For a course description, housing information and enrollment

materials, write to Dr. Merrill J. Allen, The Division of Optometry, Indiana University, Bloomington, Indiana.

NEWS FROM SUPPLIERS

Southbridge, Mass. The American Optical Company launched a new advertising campaign beginning in the March 14 issue of THE SATURDAY EVENING POST. The theme of the campaign is "Better Vision for Better Living." The first insertion appeared on the third cover of the POST in four colors and featured American Optical's "showpiece styling." Six new eyeglass frames were illustrated: The Clic, The Royal Prelude, Jeweled Royal Gaymont, The Royal Clic, The Domino and The Frost Prelude. Advertisements also will later appear in HOLIDAY MAGAZINE and ESQUIRE.

Sunnyvale, Calif. In explanation of a news story issued by a national press service regarding an action of the Food and Drug Administration of the U. S. Department of Health, Education & Welfare, the following statement was issued by H. W. Hind, president of Barnes-Hind Ophthalmic Laboratories, Inc.: "The action of the federal Food and Drug Administration in recalling lot #010159 of Barnes-Hind Wetting Solution has caused many contact lens wearers and practitioners concern. There is no need for hysteria. This product in its present form has been manufactured and used without claim of injury or damage for 19 years. The bacteria isolated by the federal Food and Drug Administration, as pointed out by the agency, will not cause damage to a healthy normal eye. The bacteria involved are common contaminants commonly found in drinking water, the air, and on most portions of the human body, including the eye lids. The company officials point out that 65,000 bottles of the recalled batch have been sold and have been in use over the entire nation for approximately four months without complaint to the date of the recall order. The company requests that all containers of the solution regardless of lot number be returned."

Rochester, N. Y. For the past several months Bausch & Lomb has published the "Here's How" series of papers. These papers are addressed to the professional optometrist and are devoted to the subject of multiple visual needs and the planning of an adequate program to meet these needs. The eighth in the series has recently been released and features the subject of frame bars. This seven-page issue is a comprehensive manual describing the various services which frame or style bars provide to the patient. There is a detailed discussion of such topics as how modern frame bars aid in eyewear classification, planning an office around a style center, frame bars as a promotion of multiple prescriptions, etc. The issue includes several photographs of the latest

designs in frame bars and furniture for the dispensing room. The "Here's How" series is available to all optometrists without charge. Requests to B&L or through its distributors will bring readers the complete series including the latest issue.

Newark, N. J. The clean, cool color of white—perennial favorite of fashion-conscious women everywhere—finds its refreshing way into Liberty's latest AD-LIB, mailed recently to optometrists, opticians and optical laboratories throughout the country. This latest edition features three of Liberty's most popular feminine frames—Liberté in White Pearl. Libby in White Tinsel and Matinee in White Pearl. All three frames are illustrated individually and on models. Full range of sizes and additional colors are also listed.

Except for the executive staff and a skeleton stock room crew to handle urgent orders, the entire Liberty Optical Manufacturing Company plant will be closed for vacation from Friday, July 3rd through Sunday, July 19th. The factory will resume operations on Monday, July 20th. In making this announcement, general manager Joseph G. Bianco suggested that Liberty customers anticipate their stock needs now and place their orders as early as possible to avoid delay caused by the factory's vacation period.

New York City. Royal Metal's new low cost Examination Chair No. 1340 is compactly designed and features a thickly-padded spring seat and a padded finger-tip-controlled adjustable back. Completely sealed, hydraulic mechanism provides full 7" rise. Dual-control pedals remain stationary as seat is raised or lowered. Fitted with adjustable professional headrest and spacious platform footrest. The chair has satin chrome finish, with wipe-clean super tuf-tex upholstery. For further information write to Royal Metal Manufacturing Company, One Park Avenue, New York City.

Rochester, N. Y. Following the introduction of the patented latch-lock on the new Rondon Browline frame, an announcement has been received that a new bar-lock fastener has been added to Shuron's most popular case, the "200 Deluxe." This bar-lock has a plus appeal for style conscious patients. Its lightweight aluminum shell protects spectacles from breakage and keeps them dust free. The case comes in five modern covers: Coronet, Mayan, Ginger, Cordovan and Blue Skiver Grain. Shuron features the "200 Deluxe" as a "patient appreciation" case—a premium case that all patients will like.

Petersburg, Va. Seventy-seven members of the North Carolina Optometric Association participated in a two-day Seminar in Occupational Vision, March 16, 17, conducted by the Division of Applied

Visual Science, Titmus Optical Company, at Petersburg, Virginia. The intensive program, keyed to the "Professional Only" concept, was built around Optometry's role in Occupational Vision with the following subjects among those covered: Meeting Socio-Health Trends in Practice: Vision for the Job: The Insurance Company in Occupational Vision: The Industrial Nurse and Eye Care: Protective Eyewear and its Use: Reports on Specific Vision Program Installations and Extending Practice through Vision Testing. The group also enjoyed guided tours through the extensive Titmus plants. Fifty-one members of the Ladies Auxiliary also made the trip, and their program was highlighted by a tour through Colonial Williamsburg. On Monday evening the group joined Company executives at a banquet and entertainment as guests of Titmus Optical Company.

Dayton, Ohio. The Univis "Use the Facts for Action" Program, introduced during early 1958 while the economy was going through a decline, has proved eminently successful. R. O. Barber, Executive Vice President of Univis, points to 3800 optometrists participating during 1958 and an additional 2400 who have joined in since the introduction of the "Action Pays" phase of the Univis Practice Development Program which began in early 1959. These optometrists have been furnished a total of 3,484,900 pieces of eyecare literature. The literature, designed for mailing to patients and to stimulate more frequent examinations and multiple eyewear prescriptions, has also taken an outstanding rise in efficiency since its early introduction. "Last year," Barber stated, "doctors reported an increase of 11% in examinations based on use of the material. Today, they are reporting an increase of slightly under 19% where the especially prepared Univis pieces are used. Analysis indicates that our company's program has been able to add an estimated 175,000 refractions from June, 1958, to the present time. Such a program runs contrary to normal thinking in considering large expenditures for promotional activities. We've made no mention of Univis products. We've simply worked with what we believe to be the basic facts in our industry. . . . Get people to obtain the visual care they need, when they need it, and our organization will receive its just percentage of prescriptions and orders for its products. The results bear this out. Univis has just completed the biggest year in its history."

St. Cloud, Minn. Mr. Robert Conn of the Vision-Ease Corporation has developed a new slide rule and chart that indicates the expected ranges of clear vision through various bifocal and trifocal additions when combined with various amounts of usable accommodation. Mr.

Conn's adaptation of this chart enables the user to instantly arrive at critical vision, plus usable vision just before and beyond the area of critical vision, merely by placing two slides, one vertical and one horizontal, into the proper position for the lens powers indicated. Conversely, by placing the slides on the desired area of critical vision, the user can arrive at the lens powers necessary to achieve the desired results. The interest expressed by those who have seen the chart has prompted The Vision-Ease Corporation to make the chart available to optometrists through optical laboratories at a nominal cost. This slide-rule chart is made of heavy-guage plastic throughout, and is complete with instructions.

NEWS BRIEFS

Two research contracts and a research grant totaling $49,000 have been awarded the Division of Optometry of Indiana University for vision research. Dr. Gordon Heath, assistant professor, is in charge of a $13,000 U. S. Air Force research project to study empty-space myopia. Dr. Merrill J. Allen, associate professor, is in charge of a $9,000 U. S. Air Force research project to study convergent accommodation. Dr. Allen is also in charge of a $26,000 Research Grant to study the mechanism of the control of accommodation as affected by age. . . . The General Meeting of the International Optical League was held in Paris, May 11, 1959. . . . The Optometric Extension Program has announced a new membership plan and course for office assistants. The cost is $36 a year payable monthly. . . . It's not often that we hear a story with an optometric twist. Two friends, Bill and Joe, died. They met for the first time after getting to heaven. "What did you die of?" said Bill. "Cancer," replied Joe, "and what did you die of?" he asked. "Seen-us," said Bill. "Seen-us, you mean sinus don't you?" said Joe. "No, I mean seen-us all right," said Bill. "You see, I was playing around with the little woman next door and her husband seen-us." . . . The Univis Lens Company announces a new round segment non-chromatic bifocal lens called UnAchrome 0-22 and they are also introducing a new gray absorption lens with 30% transmission. . . . Liberty announces a new line of six different temples styles, each fitting the Broker line of zyl frames. . . . Titmus is just completing an addition to their plant. The new building contains 50,000 square feet of floor space.

Dr. Alden N. Haffner, executive director, Optometric Center of New York, announces as its next educational symposium "An Eastern Seaboard Contact Lens Conference" on Sunday, October 25. This symposium will feature a closed circuit color television broadcast from

the Optometric Center. Invitations will be extended to optometrists from North Carolina to Maine. . . . The Titmus Merit Scholarship is established for high school seniors who intend to pursue a career in Optometry. It is now in its fourth year. In 1959 Steven Roy Peden of Dunkirk, Indiana, was the winner in national competition. He will enroll in Indiana University for his pre-optometric work and also for his undergraduate professional training. . . . The Pennsylvania State College of Optometry has received notification of the award of a grant from the Foundation for Education and Research in Vision through its Chairman, Dr. Stanley R. Block. The grant is to be used to provide a scholarship to a senior student for the 1959-60 academic year. The Foundation for Education and Research in Vision is a non-profit corporation with its principal office in Austin, Texas. The purpose of the Foundation is to promote and advance education and research in human vision and to assist financially and otherwise colleges and universities teaching optometry. . . . Dr. Mervin Kelly, former chairman of the Board of Bell Telephone Laboratories, Inc., has been appointed scientific consultant to the Bausch & Lomb Optical Company. . . . Dr. Newton K. Wesley, vice-president of the Plastic Contact Lens Company, Chicago, has announced that ultrasonic blast cleaning is now used as the final step in the manufacture of their contact lenses.

Dr. T. A. Brombach, San Francisco, director, Distinguished Service Foundation of Optometry, has announced the appointment of Dr. Frederick W. Brock, Staten Island, New York City, to the Consulting Board of the Foundation. The annual meeting of the Foundation will take place May 31, 1959, at Pacific University, Forest Grove, Oregon. . . . Dr. Louis Jaques, Sr., Los Angeles, was the speaker at the Oregon Optometric Association Convention in Medford, May 15-17. . . . Dr. Harold Neuwirth, New York City, was elected president of the New York Academy of Optometry at the January meeting. . . . The New England Chapter of the Academy met at Sturbridge, Massachusetts, on May 6. Dr. Ralph H. Green, dean, Massachusetts College of Optometry, presented a demonstration of the horoptor as related to space perception, and later lead a discussion on the recognition of ciliary muscle spasm. Dr. John K. Davis, research department, American Optical Company, Southbridge, Massachusetts, presented a demonstration of the Massachusetts Vision Test and Dr. Louis Anapole, Boston, presented a comparison of the Multi-Stereo Test and the Howard Dolman Test for depth perception. The meeting closed with a talk on the objective measurement of heterophoria and heterotropia by Dr. Marshall V. Mark, Boston, orthoptic clinician, New England Medical Center.

Dr. Thaddeus Bartels, Bristol, Connecticut, is now secretary of the New England Chapter. . . . Shuron had an eye arresting ad for women in the May issue of VOGUE.

EXHIBITORS AT A.O.A. CONGRESS IN DALLAS

The following optical manufacturers will have commercial exhibits at the annual Congress of the American Optometric Association, Statler Hilton Hotel, Dallas, Texas, June 28, 29, 30 and July 1, 1959.

Shuron Optical Company,
Geneva, New York.

Liberty Optical Company,
Newark, New Jersey.

Vogue Optical Mfg. Company,
New York, New York.

Garvin's, Inc.,
Datona, Florida.

Tura, Inc.,
New York, New York.

Vision-Ease Corporation,
St. Cloud, Minnesota.

Style-Rite Optics, Inc.,
Flushing, New York.

Modern Optics, Inc.,
Houston, Texas.

Kelley & Hueber, Inc.,
Philadelphia, Pennsylvania.

Bausch & Lomb Optical Company,
Rochester, New York.

Burton Mfg. Company,
Santa Monica, California.

American Optical Company,
Southbridge, Massachusetts.

Plastic Contact Lens Company,
Chicago, Illinois.

Art-Craft Optical Company, Inc.,
Rochester, New York.

Zylite Products Company, Inc.,
Long Island City, New York.

Kono Mfg. Company,
Charlestown, South Carolina.

Opticase Company,
Newark, New Jersey.

Hudson Optical Company,
Long Island City, New York.

Titmus Optical Company,
Petersburg, Virginia.

Glover Mfg. Company,
Austin, Texas.

Armorlite Lens Company,
Pasadena, California.

Precision-Cosmet Company, Inc.,
Minneapolis, Minnesota.

Team Optical Mfg. Corp.,
New York, New York.

Marine Optical Mfg. Company,
Roslindale, Massachusetts.

Continental Optical Company,
Indianapolis, Indiana.

Victory Optical Mfg. Company,
Newark, New Jersey.

Keystone View Company,
Meadville, Pennsylvania.

Younger Mfg. Company,
Los Angeles, California.

Century Oxford Mfg. Corp.,
Brooklyn, New York.

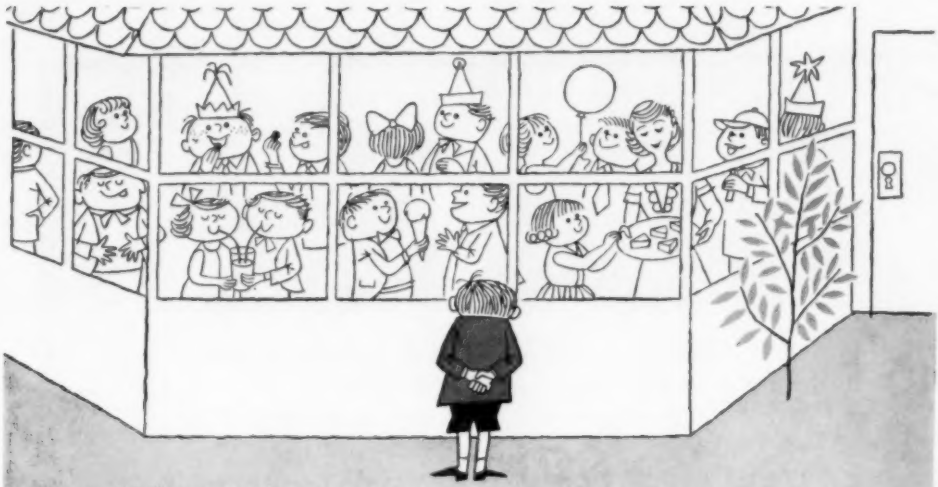
Imperial Optical Mfg. Company,
Miami, Florida.

Univis Lens Company,
Dayton, Ohio.

Barnes-Hind Ophthalmic Products,
Sunnyvale, California.

Solex Laboratories, Inc.,
Los Angeles, California.

Zylo-Ware Corporation,
Long Island City, New York.



An unsightly eye can be a great drawback to an individual at any stage of life. Other than the lack of vision or very poor acuity often associated with such a problem, these individuals are often socially handicapped and usually overlooked for positions for which they may have excellent qualifications. Employers must take into account their physical characteristics as well as mental capabilities.

Unsightly eyes...

One of the adjuncts of contact lens work is the fitting of the cosmetic contact lens. Contact lenses may be used to cover disfigured corneas and scleras; they are valuable in covering an eye with a tropia where the eye is sightless. The cosmetic contact lens can be used to fill in the eye socket in an enophthalmic eye—and a narrow palpebral fissure can be opened. More and more uses are being found for the cosmetic contact lens.

THE CONTACT LENS CIRCLE W/J

To the center of your contact lens problem

the Plastic Contact Lens Company

Dedicated to Knowledge and Research

59 E. MADISON ST. • CHICAGO 3, ILLINOIS

IRR *

Genuine Therminon lenses are formulated to absorb *Infra-Red Radiations, yet provide high visible light transmission. The result is clear vision with cool comfort. Prescribe genuine Therminon the next time a patient complains of discomfort. They are one of America's finest absorptive lenses. All reliable laboratories can supply you with Therminon lenses, or write *Therminon Lens Corporation, 63rd and University Ave., Des Moines, Iowa.*

Reduce Frame Inventory

Entirely American Made

the Rapido Line

Fastest Custom Fit Frame In The World

THE SAFETY FRAME FOR Rx OR PLANO LENSES

- **Patented Retrax Temples** slide in and out for instant fit
- **Universal Nose Bridge** fits everybody comfortably
- **Spred End Frame** makes lens replacement easy . . . no heating
- **2 Eye Sizes** — 46MM and 48MM
- **Wide choice** of popular frame colors

Available with Side Shields

WATCHEMOKET OPTICAL CO., INC.
232 WEST EXCHANGE STREET, PROVIDENCE 3, R. I.
In Canada: Levitt-Safety Ltd., Toronto 10, Montreal 26, Winnipeg

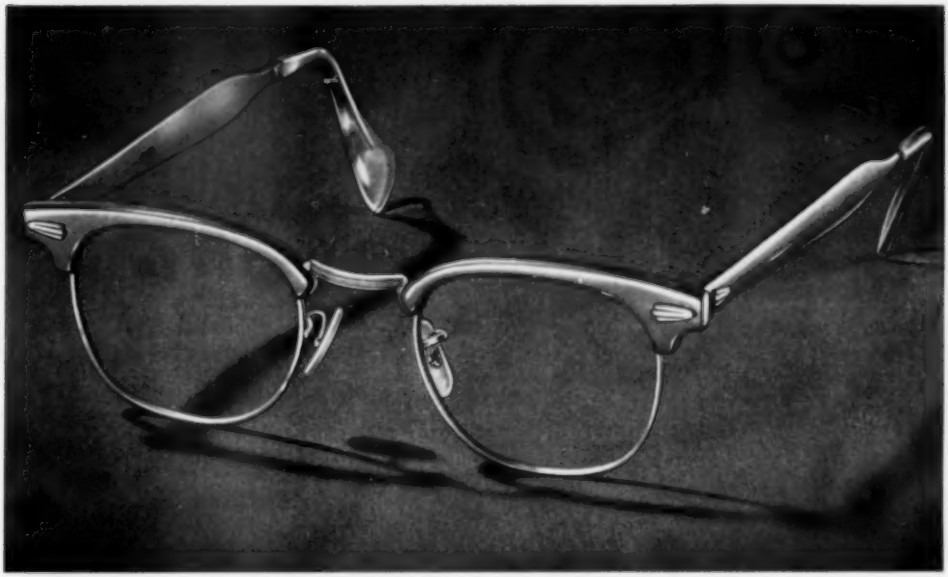
ANNOUNCEMENT BY
Illinois College of
OPTOMETRY

Applications for admission to classes beginning September 8, 1959 are now being received.

Three year course
of professional study
Leading to the Degree of
Doctor of Optometry

Requirements for Entrance:
Two years (60 semester hours or equivalent quarter hrs.) in specified liberal arts and sciences.

WRITE FOR BULLETIN
TO: REGISTRAR
ILLINOIS COLLEGE
of OPTOMETRY
3241 So. Michigan Ave.
Technology Center, Chicago 16, Ill.



Continental's Great Combination Frame for Men — *Now in Lurium*

Modish, lightweight Lurium top arms and skull temples combine with the stout 1/10 12K gold-filled chassis to bring new lift and polish to the clean-cut good looks of Mansfram, Continental's combination frame success.

Colors, gray and brown. Detachable type crystal pads. Clear crystal temple tips. Eye sizes, 44-46-48. Bridge sizes, 18 to 26.

MEMBER OF UPPER MIDWEST COUNCIL FOR BETTER VISION

MINNESOTA OPTICAL CO.

Exclusive Supplier for the Profession

621 West Lake St., Minneapolis 8, Minn.

SATISFYING RX SERVICE

is the infusion of many important elements

The use only of recognized quality products
Modern equipment and precision machinery
Highly skilled and experienced workmanship
Sales policies constructive for the Profession

The maintenance of a rigid inspection system in the processing of your prescriptions
A personal friendly Rx service adapted to your Optometric needs

TWIN CITY OPTICAL COMPANY

MINNEAPOLIS MINNESOTA WILLMAR

49 Years of Quality First

8½ Million Magnifiers Sold Each Year!

APEX READERS

- Prevents "Small-Print" Eyestrain
- Finest Ground and Polished Lenses
- Choice of Shapes, Sizes 2" to 4"

APEX QUALITY

Write for Complete Catalog!

APEX SPECIALTIES CO.
1105 Douglas Ave., Providence 4, R. I.

Complete Microfilm Reels of the entire contents of the
AMERICAN JOURNAL OF OPTOMETRY and ARCHIVES of AMERICAN ACADEMY OF OPTOMETRY
are available by annual volumes (or years), at low cost, from the
UNIVERSITY MICROFILMS
313 N. First St. Ann Arbor, Michigan
Write for prices - Immediate shipment

WALCO

SINCE 1915

COMPLETE OPHTHALMIC *Services* to the PROFESSION

- *Precision* GRINDING
- *Quality* MATERIALS
- *Craftsmanship*

CONVENIENTLY LOCATED
St. Paul, Minn. • Austin, Minn. • Bemidji, Minn.
Watertown, S.D. • Grand Forks, N.D.

WALCO
THE WALMAN OPTICAL COMPANY
229 Medical Arts Building Minneapolis 2, Minnesota
FOUNDED IN NINETEEN HUNDRED FIFTEEN

50 million people try to solve the GLARE problem themselves!

You know where these 50 million people go—the corner drug store, the dime store. Why? Many of them don't know that you can provide them with glasses that will protect them from glare . . . *and give them the visual help they need too!*

That's why Univis has developed the Light Control method . . . to help you acquaint your patients with the fact that they need not trade the full benefits of good vision for protection against glare only. Send for the booklet that tells you what Light Control is, how it can become one of your most important activities, and the complete range of Univis Light Control lenses. No charge—just mail the coupon.

*Trade-mark of The Univis Lens Co.

UNIVIS
*Light Control**
lens series

UNIVIS

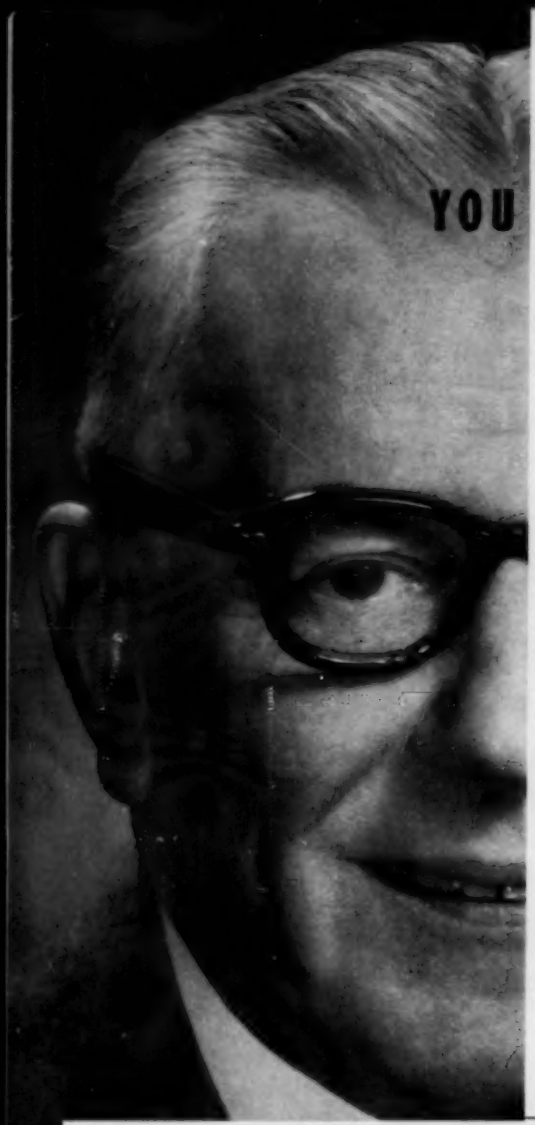
The Univis Lens Company, Dayton, Ohio
Professional Services Division

Please send descriptive booklet on Univis Light Control

Name _____

Address _____

City _____ State _____



YOU CAN'T SEE IT...
BUT IT'S THERE!

That's the beauty of the new Younger-22 Seamless Lens—it accomplishes all the aims of the ordinary bifocal, yet to anybody on the other side of the lens, it looks like single-vision!

Why is this important to presbyopes? Because the wearer no longer shows the telltale sign of aging: a visible bifocal segment.

No one greets the threshhold of middle-age with equanimity. The only reason a presbyope will accept visible bifocals today is that he or she is resigned to them as the only possible alternative to increasingly poor distance-and-near vision.

The new Younger-22 Seamless Lens is the first truly-invisible, optical-quality, dual-field lens. Not only is the segment invisible to the beholder; the wearer is not likely to be annoyed by the visible segment line; the soft transition zone between fields eliminates that.

Your presbyopic patients will welcome this ageless dual-field lens; convince yourself by trying a pair at your first opportunity!

The *New* YOUNGER-22 Seamless Lens

YOUR PATIENT TAKES NO RISK with Younger-22s. If the patient cannot wear them for any reason, it will be replaced with a fused bifocal of your choice at no additional cost.

Frame shown: Liberty's famous Broker 215

2. Front surface quality and spherical accuracy to millionths of an inch.
3. Soft transition, greater comfort and less 'bifocal shock' than a fused segment line.
1. 22mm usable segment with power deviation less than .05 diopters (4 Newton rings) — 40% more precise than industry standards.
4. Segment and transition size deviation less than .0125mm, with no chromatic aberration—color-free.

YOUNGER
Los Angeles 15, California